

TERMS OF REFERENCE
FOR
THE STUDY ON KAMPAR-INDRAGIRI RIVER BASIN
DEVELOPMENT PROJECT

1. BACKGROUND AND SUPPORTING INFORMATION

1.1 Background and Justification of the Project

The Kampar and Indragiri rivers originate in West Sumatra's part of the Sarisan Mountains that form the backbone of Sumatra Island. They flow into the vast plain of Riau Province after flowing down eastward through the hilly area and finally pour into the Malacca Strait.

The two rivers are not only adjacent with each other and flow nearly in parallel, but have similar geomorphological, geological and hydrological characteristics. The length of both rivers from the watershed to the river mouth is approx. 500 km, and the catchment area of the Kampar is 23,750 km², whereas the Indragiri is 27,000 km².

In the upstream area, the mainstream and tributaries of both rivers are all within the same province, West Sumatra, and they are so intricately related with each other that the local people may have a scarce notion of the river basin. The middle and lower reaches of both rivers run through the terrain where there is no significant water divide and the largest transmigration area covering the principal municipalities of Riau Province such as Pekanbaru, Rengat, Lipatkain and Taluk is set up across both rivers. Under these circumstances, any water resources development project on either river may provide both river basins with benefits that are common to or exchangeable between the two. It is, therefore, necessary to take together into consideration the potential development of both rivers in formulating a well-coordinated development plan or evaluating priority of prospective projects. In view of the above, it is

appropriate to formulate an overall water resources development plan covering the whole drainage area of the two rivers, totaling 50,750 km², to be called Kampar-Indragiri Basin.

The major problems as well as possible forms of development related to water in the basin are as follows:

- (1) Disasters caused by flush floods and mudflows in the upstream area.
- (2) Bank erosion and inundation caused by floods in the middle and lower part of the basin.
- (3) Hydropower generation in the upstream basin that is endowed with abundant rainfall and favorable topography.
- (4) Irrigation development in the vast track of land in the middle and lower parts of the basin with ample flow of the main rivers.
- (5) Diversion or exportation of excess water to the area outside the basin, to Singapore for instance.

In recent years, two (2) hydropower development projects have been activated in the upstream basin, namely the Kotapanjang Hydropower Project in the Upper Kampar River with a dam and reservoir and the Anai Hydropower Project, by diverting the steady flow of the upper reaches of the Kuantan (customary name for the upper reaches of the Indragiri). These projects with the prospective installation capacity of 110 MW and 200 MW, respectively, are expected to support the development of the basin by supplying electric energy.

However, formulation of these projects has not been based on the comprehensive idea of basinwide water resources development. In other sectors of water resources

development and the disaster prevention sector, little has so far been done as public works, except small scale irrigation works and erosion control works in limited localities.

The living standard of the people in the Kuantan-Indragiri Basin remains relatively low, although the basin has a high potential of development and petroleum oil is intensively exploited to support the national economy. The basin has also a great possibility of receiving transmigration, the success of which depends much on the provision of infrastructures such as disaster proofing, irrigation and drainage. Considering the above situation of the basin, a comprehensive water resources development plan should be formulated with a view to promoting a systematic implementation of priority projects.

Since the main rivers of the basin flow through two different provinces, there may be a conflict or even a confrontation around the river works or water use. It is desirable in this connection that a well harmonized plan of development be drawn up by the central government with participation of both riparian provinces.

In view of the above and of the experience of recurrent flood disasters in recent years, it is urgently required to initiate the proposed study for the expeditious development of the basin.

1.2 Project Title

The project title shall be "The Study on Kampar-Indragiri River Basin Development Project."

1.3 Institutional Framework

The executing agency for the study is the Directorate General of Water Resources Development, Ministry of Public Works, Government of the Republic of Indonesia. Technical

assistance is expected to be provided from external sources. Counterpart and logistical support to the extent necessary for the satisfactory completion of the project will be provided by the Directorate General of Water Resources Development and coordination with other agencies concerned will be made through the local counterpart personnel to be assigned to the Study.

1.4 Relevant Studies, Surveys and Reports

The preceding studies, surveys and reports relevant to this proposed study are as follows:

- (1) Institut Pertanian Bogor; 'Laporan Hasil Pelaksanaan Survey dan Pemetaan Tanah di Daerah Kotabaru-Delta Retih', 1973.
- (2) Nucleus Estates/Smallholder Development Project, Air Melek, Directorate of Smallholder Estates, 1975.
- (3) Directorate General of Estates, Ministry of Agriculture; 'Phase I Report, Water Resources Study Air Melek (NES II Project)', by Binnie and Partners, Ltd.
- (4) Directorate of Swampy Areas, DGWRD; 'Survey dan Pemetaan Tanah Daerah Sungai Indragiri Kanan', by Sub-P4S Riau, 1976.
- (5) Universitas Sumatra Utara; 'Lapor Survey Kepabilitas Tanah dan Rencana Pengembangan Pertanian Proyek Transmigrasi de DAS Indragiri belakang kota Rengat', 1977.
- (6) Universitas Sumatra Utara; 'Survey dan Pemetaan Tanah Daerah Kuala Cínako', 1977
- (7) BAPPEDA Riau; 'Sekelumit Data Riau', 1979.

- (8) Directorate of Planning and Programming, DGWRD: "Identifikasi Perencanaan Pengembangan Wilayah Sungai Bt. Kampar, Bt. Rokan dan Bt. Siak Propinsi-Riau", by ISUDA, 1979-1980.
- (9) Kampar and Rokan Hydroelectric Power Development Project, Riau, Reconnaissance Report: Tokyo Electric Power Services Co., Ltd.; March 1980.
- (10) Kampar and Rokan Hydroelectric Power Development Project in Riau, Prefeasibility Report: Tokyo Electric Power Services Co., Ltd.; October 1980.
- (11) Kampar and Rokan Hydroelectric Power Development Project in Riau, Report II, Project and Development Planning: Tokyo Electric Power Services Co., Ltd.; January 1981.
- (12) Directorate of Planning and Programming, DGWRD: "Water Resources and Potentially Irrigable Land of Riau", by Binnie and Partners, Ltd.; July 1981.
- (13) PLN; "Lake Singakrak Development Anal Project", 1983.
- (14) Prefeasibility Report on the Kuantan River Hydroelectric Power Development Project: Tokyo Electric Power Services Co., Ltd.; July 1983.
- (15) Kotapanjang Hydroelectric Power Development Project, Feasibility Study: Japan International Cooperation Agency; March 1984.
- (16) Reconnaissance Survey Report on the Sinamar River Hydroelectric Development: Tokyo Electric Power Services Co., Ltd.; January 1984.

(17) IECA, Tokyo, Japan: "Report on Reconnaissance Survey for Comprehensive Water Resources Development Planning Study of the Kuantan-Indragiri River Basin in Indonesia", 1984.

(18) IECA, Tokyo, Japan: "Study on the Kuantan-Indragiri River Basin Development Project", 1991.

2. OBJECTIVE OF THE PROJECT

2.1 Long Term Objectives

The long term objective is to formulate the overall plan of comprehensive river basin development to ensure the well-balanced development in the basin. In addition to the above, the other objectives are as follows:

- (1) To identify the priority of project components based on the results of the overall plan study.
- (2) To show a model for solving similar water problems in Indonesia.
- (3) To effect transfer of technology and method of comprehensive river basin development planning.

2.2 Immediate Objectives

The immediate objective is to carry out a feasibility study for urgent flood control projects for flood damage mitigation in habitually inundated areas and cities, which are supposed to have a high priority of implementation.

5. PLAN OF OPERATION

3.1 Scope of Work

(1) Review of Relevant Plans and Studies

All plans and studies relevant to flood control works and water resources development in the river basin will be reviewed and evaluated to identify the problems of flood, water supply and power supply.

(2) Execution of Necessary Surveys and Investigations

The surveys and investigations required for the study are as follows:

- (a) Longitudinal and cross-sectional survey along the main rivers, tributaries and branches, including proposed cut-off channels and diversion channels;
- (b) Aerophotogrammetry and mapping of the flood-prone area (Scale: 1:10,000; Contour Interval: 1.0 m);
- (c) Topographic survey (or aerophotogrammetry) and mapping covering the sites of the proposed dams (Scale: 1:5,000); and
- (d) Geological and soil mechanics investigation for the sites of major structures, including the proposed dams.

(3) Collection of Data and Information

This will involve the collection of available data and updated information regarding the following:

- (a) National and regional socioeconomy;

- (b) Previous studies and plans related to flood control, irrigation and municipal water supply, and power supply projects;
- (c) Meteorology and hydrology;
- (d) Soil and geological conditions;
- (e) Existing structures related to the projects;
- (f) Flood inundation and damage;
- (g) Water demand and supply for agriculture, irrigation, plantation and other purposes;
- (h) Power demand and supply;
- (i) Municipal and industrial water demand and supply; and
- (j) Development plans such as transmigration and regional development, etc.

(4) Study and Analysis

The studies and analysis required for the formulation of the Overall Plan are as follows:

- (a) Hydrological and hydraulic analyses for flood runoff, discharge statistics, irrigation, plantation, municipal water and other purposes, and power generation;
- (b) Soil and geological conditions of dam sites, river and riparian areas, and sediment;
- (c) Land classification with respect to the type of flood disasters;

- (d) River improvement, irrigation, plantation and municipal water supply, and power generation plans;
- (e) Flood control plan and water resources development potential of proposed reservoirs;
- (f) Flood damage estimate based on present/future land use and assets;
- (g) Water demand projection in the future; and
- (h) Assessment of social and environmental impact caused by project implementation.

(5) Formulation of the Overall Plan

A strategic and long-term program shall be drawn out by the overall plan consisting of the components of flood control and water resources development in the river basin. The plan shall be formulated by evaluating the possible alternatives on the basis of economic superiority as well as technical soundness. An implementation schedule which defines the area, period, investment programs and major contents of stepwise plans shall also be prepared.

Within the framework of the overall plan, urgent projects of flood control will be selected and a feasibility study will be conducted.

(6) Feasibility Study on Urgent Projects

The urgent projects selected from the overall plan study shall be formulated for early implementation. It will involve the following works:

- (a) Survey and investigation of areas seriously damaged by floods;

- (b) Formulation of countermeasures/counteraction works;
- (c) Preliminary design for the works;
- (d) Socioeconomic evaluation of the works; and
- (e) Environmental assessment.

(7) Transfer of Knowledge

This will involve the transfer of knowledge to, and the training of, selected government staff, including:

- (a) Technical assistance in carrying out the necessary survey and investigation through On-the-job Training; and
- (b) Training in overseas country for the selected government staff to obtain wider knowledge on modern practices and techniques related to the project.

3.2 Time Schedule of the Study

The Time Schedule of the Study is as shown in Fig. 1.

4. EXTERNAL AND GOVERNMENT INPUT

4.1 External Input

4.1.1 Expertise Required

The Study will require expert services of 180 man-months. The designations of experts are shown in the attached Staffing Schedule (Fig. 2), summarized as follows:

- (1) Team Leader
- (2) River Engineer
- (3) Flood Control Engineer
- (4) Water Resources Engineer
- (5) Hydrologist
- (6) Dam Engineer
- (7) Geotechnical Engineer
- (8) Geomorphologist
- (9) Geodetic Engineer
- (10) Agricultural Engineer
- (11) Hydroelectric Engineer
- (12) Irrigation/Drainage Engineer
- (13) Structural Engineer
- (14) Construction Planner
- (15) Cost Estimator
- (16) Environmental Engineer
- (17) Project Economist

4.1.2 Fellowship

A training program for counterpart personnel will be carried out. Fellowship for 18 man-months is required in the home country of the consultant and in other places where subjects involved are available (including consultant's office, university or other institutions). A series of lectures to enhance the knowledge and practical experience of the counterpart personnel in fields of engineering such as flood control, river improvement, hydropower generation, water resources development for

municipal and industrial water, irrigation, dam construction, geological engineering, aero-mapping and topographical surveys, project economics and agricultural extension services, are recommended.

4.1.3 Equipment

To ensure the efficient and timely completion of the Study, the following equipment will be provided for the project by the donor country:

- (1) Six (6) four-wheel drive vehicles;
- (2) Two (2) motorboats; and
- (3) Office equipment and field work equipment for hydrologist, agricultural engineer, and geologist/topographical surveyor.

4.1.4 Mapping

Aerophotogrammetry and mapping which are described in Subsection 3.1 will be conducted by the donor country to ensure the effective implementation of the Study.

4.1.5 Estimated Cost

The estimated costs of the Study are as follows:

(1) Expert Services of 180 Man-Months	US\$3,600,000
(2) Fellowship	120,000
(3) Equipment	200,000
(4) Aerophotogrammetry and mapping	500,000
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Total	US\$4,420,000

4.2 Input by the Government of Indonesia

The Government of Indonesia (GOI) will undertake the following:

- (1) Provision of Indonesian project personnel as counterpart and support staff;
- (2) Office accommodation furnished with standard furniture and fixtures, as well as stationery, in the project area, including maintenance and office running costs;
- (3) Vehicles for the counterpart staff;
- (4) Provision of available maps, aerial photographs, data and reports, and other materials relevant to the Study;
- (5) Implementation of supplementary work of laboratory analysis or other investigations and surveys as needed; and
- (6) Exemption from import duties and taxes of personal effects of the experts and all equipment brought in for the Study.

5. REPORTING

The following reports shall be submitted to the Directorate General of Water Resources Development (DGWRD):

(1) Inception Report

An inception report shall be submitted in 25 copies two (2) months after commencement of the Study. This report shall clarify the work to be carried out and comment on previous reports and data. It shall present the main work plan for the Study and outline the program for the investigation and survey.

(2) Interim Report

An interim report shall be submitted in 25 copies twelve (12) months after commencement of the Study. This report shall summarize the formulation of the overall plan, together with the selection of the priority projects.

(3) Draft Final Report

A draft final report shall be submitted in 25 copies within twenty-two (22) months after commencement of the Study. This report will present the final formulation of the overall plan. The DGWRD will present its comments to the Study Team within one (1) month after receipt of this report.

(4) Final Report

The final report shall be submitted in 50 copies at the conclusion of the Services, not later than twenty-four (24) months after the commencement date of the Services.

The reports referred to above shall be prepared in English, and the metric system shall be exclusively applied in all outline designs, drawings and calculations.

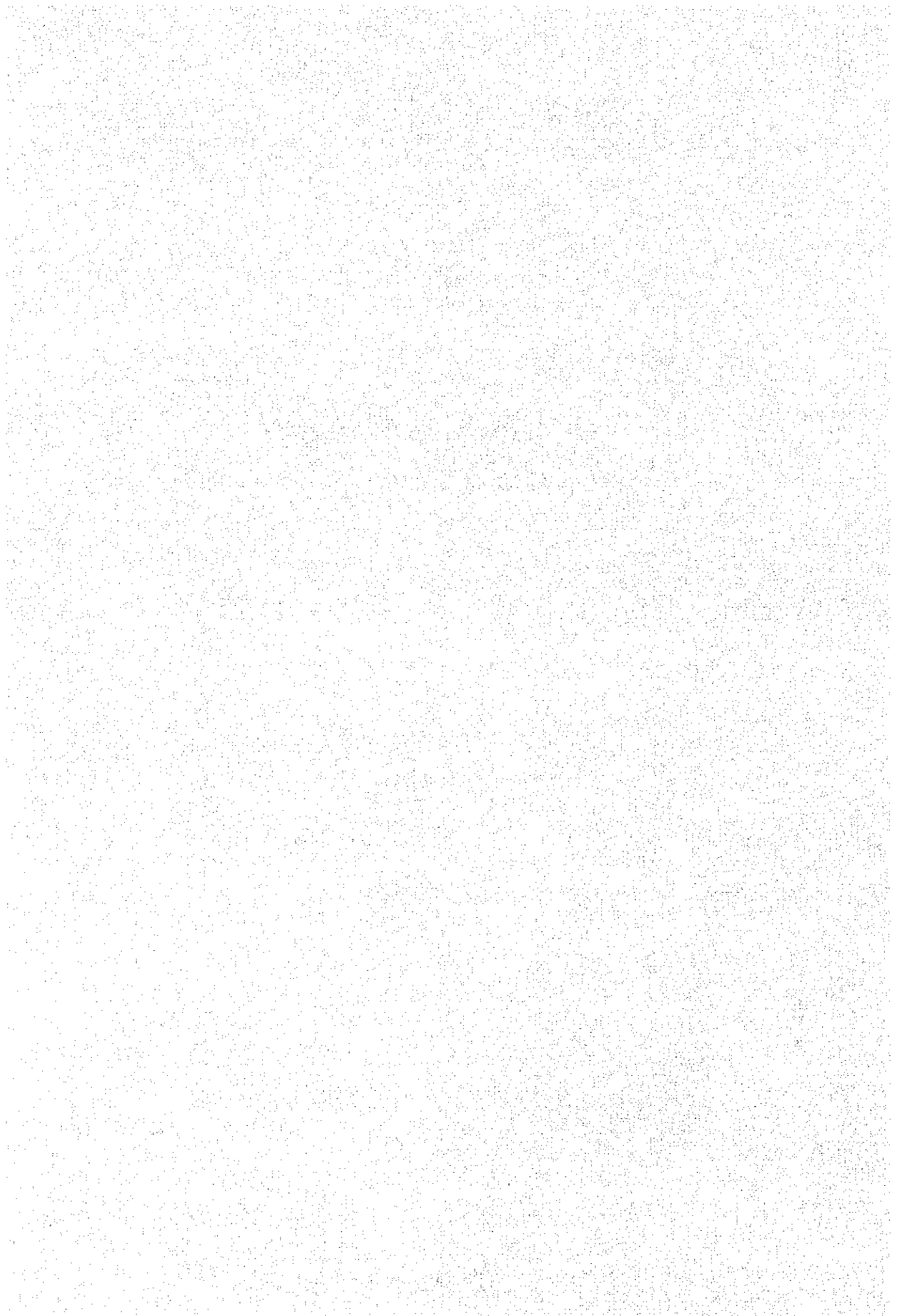
FIG. 1. TIME SCHEDULE OF THE STUDY

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. FIELD STUDY																								
2. STUDY IN HOME COUNTRY																								
3. REPORTING																								
3-1. Inception Report																								
3-2. Interim Report																								
3-3. Draft Final Report																								
3-4. Final Report																								

FIG. 2. STAFFING SCHEDULE

DESIGNATION	MONTH												MAN-MONTH													
	1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	16	17	18	19	20	21	22	23	24	
(1) Team Leader	1																									22
(2) River Engineer	1																									21
(3) Flood Control Engineer																										14
(4) Water Resources Engineer																										10
(5) Hydrologist																										13
(6) Dam Engineer																										9
(7) Geotechnical Engineer																										0
(8) Geomorphologist																										5
(9) Geodetic Engineer																										0
(10) Agricultural Engineer																										0
(11) Hydroelectric Engineer																										12
(12) Irrigation/Drainage Engineer																										12
(13) Structural Engineer																										11
(14) Construction Planner																										6
(15) Cost Estimator																										6
(16) Environmental Engineer																										7
(17) Project Economist																										8
Total																										100

2. Scope of Work (S/W)



SCOPE OF WORK
FOR
THE STUDY
ON
KAMPAR-INDRAGIRI RIVER BASIN DEVELOPMENT PROJECT
IN
THE REPUBLIC OF INDONESIA

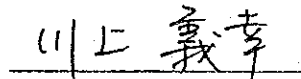
AGREED UPON BETWEEN

DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
MINISTRY OF PUBLIC WORKS
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Jakarta, September 28, 1993



DJOKO S. SARDJONO
DIRECTOR OF PLANNING AND PROGRAMMING
DIRECTORATE GENERAL OF WATER
RESOURCES DEVELOPMENT,
MINISTRY OF PUBLIC WORKS



YOSHIYUKI KAWAKAMI
LEADER
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia (hereinafter referred to as "Government of Indonesia"), the Government of Japan has decided to conduct a Study on Kampar-Indragiri River Basin Development Project (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Indonesia.

The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are to formulate an overall development plan of Kampar-Indragiri river basin and to carry out a feasibility study for priority project(s) within the overall development plan.

III. THE STUDY AREA

The study area shall cover the catchment area (approximately 50,000km²) of the Kampar-Indragiri river basin.



IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following.

1. Phase I :

Overall Development Plan of Kampar-Indragiri River Basin

(1) Data collection and review of previous studies

- a. National, regional and socio-economic data
- b. Previous studies and relevant plans related to flood control, irrigation and municipal water supply, and power supply projects
- c. Topographical data and maps
- d. Meteorological and hydrological data
- e. Soil and geological data
- f. Existing hydraulic structures and other relevant facilities
- g. Flood inundation and damage
- h. Water demand and supply for agriculture, irrigation, plantation, municipality, industry and other purposes
- i. Power demand and supply
- j. Other related data and information

(2) Field surveys and investigations

- a. Longitudinal and cross-sectional survey along the main rivers, tributaries and branches
- b. Aerophotogrammetry and mapping
- c. Topographic survey
- d. Geological and soil investigation
- e. Meteorological and hydrological observation
- f. Present water use investigation
- g. Flood inundation and damage investigation
- h. Present land use and assets investigation
- i. Survey for initial environmental examination
- j. Others



(3) Study and Analysis

- a. Hydrological and hydraulic analysis
- b. Geological and soil analysis
- c. Flood damage estimate
- d. Water demand projection
- e. Others

(4) Formulation of the overall development plan

(5) Preliminary plan of facilities

(6) Cost estimation

(7) Initial environmental examination

(8) Evaluation of the overall development plan

(9) Selection of high priority projects for the feasibility study

2. Phase II :

Feasibility Study

(1) Necessary supplemental surveys and data collection

(2) Structures and facilities plan

(3) Preliminary design for the structures and facilities

(4) Construction plan

(5) Organization, operation and maintenance plan

(6) Cost estimation

(7) Environmental impact assessment

(8) Project evaluation

(9) Project implementation program

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V. STUDY SCHEDULE

The Study shall be carried out in accordance with the attached tentative study schedule (APPENDIX).

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Indonesia.

1. Inception Report

Thirty (30) copies within one (1) month from the commencement of the Study.

2. Progress Report (1)

Thirty (30) copies within nine (9) months from the commencement of the Study.

3. Interim Report

Thirty (30) copies within thirteen (13) months from the commencement of the Study.

4. Progress Report (2)

Thirty (30) copies within sixteen (16) months from the commencement of the Study.

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5. Draft Final Report

Thirty (30) copies within twenty-one (21) months from the commencement of the Study.

Government of Indonesia will present its comments to JICA within one (1) month after the receipt of Draft Final Report.

6. Final Report

Fifty (50) copies within two (2) months after JICA's receipt of the said comments on the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMENT OF INDONESIA

1. To facilitate smooth conduct of the Study, the Government of Indonesia shall take necessary measures:

(1) to secure the safety of the Japanese study team,

(2) to permit the members of the Japanese study team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,

(3) to exempt the members of the Japanese study team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into Indonesia for the conduct of the Study,

A handwritten signature and initials, possibly 'A. U.', enclosed in a circle.

- (4) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study,
 - (5) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Indonesia from Japan in connection with the implementation of the Study,
 - (6) to secure permission for entry into private properties or restricted areas for the implementation of the Study,
 - (7) to secure permission for the Japanese study team to take all data and documents related to the study out of Indonesia to Japan,
 - (8) to provide medical services as needed. Its expenses will be chargeable on members of the Japanese study team.
2. The Government of Indonesia shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Japanese study team.

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3. Directorate General of Water Resources Development (hereinafter referred to as "DGWRD") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.
4. DGWRD shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned:
 - (1) available data and information related to the Study,
 - (2) counterpart personnel and support staff necessary for the study,
 - (3) suitable office space with necessary equipment in Pekanbaru,
 - (4) credentials or identification cards.

VIII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, the Japanese study team to Indonesia,
2. to pursue technology transfer to the Indonesian counterpart personnel in the course of the Study.

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IX. OTHERS

JICA and DGWRD shall consult with each other in respect of any matter that may arise from or in connection with the Study.

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APPENDIX

TENTATIVE SCHEDULE

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WORK IN INDONESIA																								
WORK IN JAPAN																								
REPORT																								

REMARKS: IC/R : Inception Report
 P/R : Progress Report
 IT/R : Interim Report
 DF/R : Draft Final Report
 F/R : Final Report

○ : comments from Indonesian side


3. Minutes of Meeting (M/M)

MINUTES OF MEETING
FOR
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ON
KAMPAR-INDRAGIRI RIVER BASIN DEVELOPMENT PROJECT
IN
THE REPUBLIC OF INDONESIA

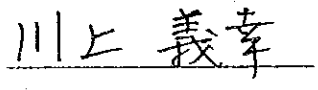
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In response to the request of the Government of the Republic of Indonesia, the Preparatory Study Team of Japan International Cooperation Agency (hereinafter referred to as "the Team"), visited Indonesia from September 19th, 1993 to discuss the Scope of Work for the Study on Kampar-Indragiri River Basin Development Project (hereinafter referred to as "the Study").

The Team carried out field surveys of the study area and held series of discussions with officials of Directorate General of Water Resources Development (hereinafter referred to as "DGWRD").

This document set forth the main points discussed during the above period.

This draft Scope of Work (hereinafter referred to as "S/W") proposed by the Team was discussed in details between the Team and DGWRD and both sides agreed to adopt the Scope of Work with following understandings:

1. In reference to II. of the S/W (OBJECTIVES OF THE STUDY), both sides confirmed that the Study would be focussed on the aspects of water resources development, flood control and river stabilization.
2. In reference to III. of the S/W (THE STUDY AREA), both sides agreed that the projection of municipal water demand in Pekanbaru would be conducted supplementary by JICA study team based on the necessary data and information related to Pekanbaru, which would be provided by DGWRD.
3. In reference to IV. of the S/W (Scope of the Study), both sides agreed that the target year of the Study would be setting up 2019, which corresponded to a year of the end of the Government Second Long Term Development Plan for 25-years.
4. In reference to IV. 1. (1) of the S/W (Data collection and review of the previous studies), both sides agreed to include the data and information of

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inland water ways as one of those items to be collected in (j) Other related data and information.

5. In reference to IV. 1. (4) of the S/W (Formulation of the overall development plan), both sides agreed that the survey specifically aimed at the water export to Singapore would not be included in the Study, and DGWRD would examine the amount of water export to Singapore based on the preliminary projection of water supply and demand in the study area, which would be prepared by JICA study team.

6. In reference to IV. 1. (7) and 2. (7) of the S/W (Initial environmental and examination and Environmental impact assessment), both sides agreed that DGWRD would take necessary procedure to the approval by the Environmental Assessment Commission on Preliminary Environmental Information Report (PIL), and Environmental Impact Analysis (ANDAL), which would be prepared by JICA study team, and the approval of PIL would be taken by the arrival time of JICA study team for the purpose of implementation of the feasibility study.

7. In reference to IV. 1. (8) of the S/W (Evaluation of the overall development plan), both sides confirmed that the criteria for the selection of high priority projects for the feasibility study should be clarified in the overall development plan and the criteria would be discussed and agreed by the steering committee.

8. In reference to VII. 1. (7) of the S/W (Secure the permission of all data and documents), both sides confirmed that permission of taking data and documents out of Indonesia should follow the regulation of Indonesian Government.

9. In reference to VII. 3. of the S/W (DGWRD as counterpart agency), the both sides agreed that DGWRD would organize the steering committee, which was responsible for policy matters and the technical committee, which handled day to day technical affairs.



10. In reference to VII. 4. (2) of the S/W (Provision personnel and support staff by DGWRD), the Team requested DGWRD to provide support staff. DGWRD answered that those staff who would occupied in necessary assistant works, would be provided, while it would be impossible to provide them who would specifically assigned for the Study.

11. DGWRD requested the following additional survey would be carried out by local consultant to be financed by JICA.

- (1) Aerophotogrammetry and mapping
- (2) Topographic survey
- (3) Geological and soil investigation
- (4) Meteorological and hydrological observation
- (5) Survey for initial environmental examination and environmental impact assessment

On the other hand, DGWRD promised to provide the satellite image necessary to conduct an overall development plan.

12. DGWRD requested acceptance of three (3) counterpart personnels to Japan for training during three (3) months.

13. The Team requested DGWRD to provide vehicles necessary for the conduct of the Study.

DGWRD answered that it was impossible to provide them for financial reasons and strongly requested a provision of six (6) four-wheel drive vehicles, two (2) motorboats with 120 HP capacity, and one (1) set of computer system including Geographical Information System.

14. Regarding the requests from DGWRD mentioned above items 11, 12, and 13, the Team answered to convey the requested to JICA Headquarter in Japan.

15. A list of attendants to the meeting is shown in the attached paper 1.

U/B

LIST OF ATTENDANTS

I. DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT (DGWRD)

Directorate of Planning and Programing

1. Djoko S. Sardjono Director of Planning and Programing
2. Soenarto Soenjojo Chief of Sub-Directrate of River Basin Development Management
3. Wahyuno, Ms Chief of Survey Section, Sub-Directrate of Planning and
Programing
4. Soeharto Staff of Sub-Directrate of River Basin Development Management

Directorate of Irrigation I

5. Harmadi Staff of Sub-Directrate of Planning and Design

Directorate of Rivers

6. Soeradji, Dip.HE Chief of Sub-Directrate of Planning and Design
7. Supriana Chief of Survey Section, Sub-Directrate of Planning and
Design

Directorate of Swamp

8. Basuki Staff of Sub-Directrate of Planning and Programing

II. PREPARATORY STUDY TEAM

1. Yoshiyuki KAWAKAMI Leader
2. Yasunari WATANABE Member
3. Masaaki KATO Member
4. Toyolaka NIWA Member
5. Takanori TAKATSUKA Member

III. JICA Expert

1. Toru TAKAHASHI Directorate of Rivers, DGWRD

9/3 A

4. 質 問 書

REQUIRED DATA AND QUESTIONNAIRE
FOR
STUDY ON KAMPAR-INDORAGIRI RIVER BASIN DEVELOPMENT PROJECT
IN
THE REPUBLIC OF THE INDONESIA

September 1993

Japan International Cooperation Agency

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7. Unit Cost and Others -----	122

DATA TO BE COLLECTED

○ : Available , × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
1. General					
1.1. National development plan (existing long-term plan or five years plan)					
1.2. Regional development plans related to the Study					
(1) Flood control					
(2) Agriculture					
(3) Water supply					
(4) Hydropower generation					
(5) Transmigration					
(6) Environmental conservation					
1.3. National census related to the Study					
1.4. Provincial Profile (Sumatora Barat and Riau)					
1.5. Socio-economic conditions in above two provinces					
(1) Administrative district (city, town and village)					
(2) Population and household					
(3) Land use					
(4) Infrastructure					
a) Road condition					
b) Transportation					
c) Electricity					
d) Telecommunication / postal service					
e) Potable water supply					
f) Wells					
(5) Industry					

DATA TO BE COLLECTED

○ : Available, X : Not Available

Data/Item	Availability (○ or X)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(6) Agriculture (irrigation)					
(7) Tourism and historical area					
1.6. Budget in the last five years					
(1) National budget by ministry					
(2) Ministry of Public Works (MPW)					
(3) Kampar-Indragiri River Basin (K-IRB)					
(4) Maintenance cost for road, bridges, flood control facility and etc. in K-IRB					
(5) Annual Report of the Directorate General of Water Resources Development (DGWRD)					
1.7. Institution and Organization					
(1) Structures and key functions of the following organizations, their interrelations and their relations with other government agencies. A diagram shown interrelation of the organizations and other government agencies.					
a) Directorate General of Water Resources Development (DGWRD)					
b) Directorate General of Human Settlement (CIPTA KARYA)					
c) Ministry of Agriculture					
d) Agency for Research and Development					
e) Persahaan Umum Listrik Negara (PLN)					
f) Ministry of Transmigration					
(2) Their capitalization, budgeting and funding and their recent summarized financial statements					

DATA TO BE COLLECTED

○ : Available , × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(3) Function and/or job-description of each division, section, and sub-section of the above organizations including the number of staff. For what work for project implementation, they are involved and how.					
(4) Other agencies concerned with the projects, if any. Their key functions and government financial supports they receive.					
(5) Any involvement of local government, their key functions and financial supports by government.					
(6) Budgetary system of the MPW Procedures required for project planning, budget preparation, internal screening and final approval.					
2. Topography, Geology and Land Use					
2.1. Topographic maps including the Ilog-Hilabangan river basin					
(1) Scale 1:250,000					
(2) Scale 1: 50,000					
(3) Scale 1: 25,000					
(4) Scale 1: 5,000					
(5) Available maps related to the basin and effective for the Study.					
2.2. Geological maps including the K-IRB					
(1) Scale 1:250,000					
(2) Available maps related to the basin and effective for the Study.					
2.3. Design drawings of the completed / on-going / proposed river improvement projects in K-IRB					
(1) Plan of river improvement					

DATA TO BE COLLECTED ○ : Available, × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(2) Longitudinal profile and cross-section of river improvement					
(3) River width in major reaches or points					
(4) Channel depth in major reaches or points					
(5) Variations of river course and river bed in the past					
2.4. Aerophotographs (the latest photos)					
(1) Photographing year					
(2) Scale of photographs					
(3) Scope of drawing					
(4) Scale of drawing					
(5) Interval of counter line					
(6) Control point (location and altitude)					
(7) Triangulation station					
(8) Permission for the Study Team to take them out to Japan					
2.5. Land use maps including K-IRB					
(1) Investigation / Publication year					
(2) Scale					
3. Climatic and Hydrological Data in and around the K-IRB					
3.1. Location map of meteorological and hydrological observation stations					
(1) Rain gauge stations					
(2) Stream flow gauging stations					
(3) Tide gauge stations					

DATA TO BE COLLECTED

○ : Available , × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(4) Flood warning stations					
3.2. List of meteorological and hydrological observation stations					
(1) Station name					
(2) Location / Address					
(3) Code number of station					
(4) Observation items					
(5) Period of observation					
(6) Authorities concerned					
3.3. General climate at major stations					
3.4. Specific climate on rainfall, wind and tide ever recorded at major stations					
3.5. Hyetograph of storms which caused major historical floods in the Study Area					
(1) Hourly rainfall of major storm at major stations					
(2) Hourly hydrograph of major flood flow at major stations					
(3) Probable rainfall intensities for the duration of 1, 2, 3, 4, 6, 12, 18 and 24 hours					
(4) Isohyetal maps					
3.6. Water level and discharges at major stations					
(1) Monthly runoff					
(2) Annual maximum water level and discharge, and their frequencies					
(3) Hourly water level and discharge of major flood observed					

DATA TO BE COLLECTED ○ : Available , × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(4) Rating curve					
(5) Method of discharge observation					
(6) Authorities concerned					
4. Flood Control and Relevant Information					
4.1. Report, record and information on the past flood damage in the Basin					
(1) Occurrence year					(2) Cause
(3) Inundation area and damage to farm land and properties					
(4) Damaged flood control facilities and other infra-structure such as bridges, roads, railway, dams and irrigation weirs					
(5) Degree of river bank erosion and extent					
(6) Extent of soil erosion, if any					
4.2. Fundamental policy for flood control program in the Basin					
4.3. Present condition of existing flood control facilities in the Basin					
4.4. Information regarding the completed / ongoing / proposed flood control projects in the Basin					
(1) Project name					
(2) Titles and contents of project reports					
4.5. Information regarding the completed / ongoing / proposed dam construction projects in the Basin					
(1) Project name					
(2) Titles and contents of project reports					

DATA TO BE COLLECTED

○ : Available, × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
5. Present Water Use and the development plans					
5.1. Existing condition of water use					
(1) Irrigation					
(2) Industrial and domestic water supply					
(3) Hydropower Generation					
(4) Navigation					
(5) Others					
5.2. Existing systems and development projects including their locations					
(1) Irrigation					
(2) Industrial and domestic water supply					
(3) Hydropower Generation					
(4) Navigation					
(5) Others					
5.3. Feasibility /Summary Report of existing and proposed water use projects					
(1) Kotapandjari hydropower generation project					
(2) PLN: Lake Singakrak Development Anai Project, 1983					
(3) DPP, DGWRD: Water resources and potentially irrigable land of Riau by Binnie and Partners, Ltd., July 1981					
(4) DGE, MOA: Phase I Report, Water Resources Study Air Melek (NESII Project) by Binnie and Partners, Ltd., July 1981					
(5) Directorate of Smallholder Estates: Nucleus Estates/ Smallholder Development Project, Air Melek, 1975					
(6) Others, if any					

DATA TO BE COLLECTED ○ : Available , X : Not Available

Data/Item	Availability (○ or X)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
6. Environmental condition					
6.1 Question					
The following questions are useful for preliminary environmental survey. Please describe present understanding.					
(1) Resettlement					
a) Existence of people to be resettled with project implementation. If any, plan of resettlement area and compensation plan.					
b) Experience of resettlement in implemented projects, if any.					
c) Cultural or religious characters to be mentioned especially related to the project.					
d) Existence of ethnic minorities, if any, the sites and the population.					
(2) Economic activities					
a) Probability of loss of economic opportunity with project.					
b) Negative structural change in economic society with project.					
(3) Transportation and living condition					
a) Negative impact given into the existing public facilities such as schools, hospitals and religious facilities with new transportation system. If any, their locations.					

DATA TO BE COLLECTED

○ : Available , × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(4) Community					
a) Existence of communities which will be split by the project. If any, their locations.					
(5) Ruins/Cultural property					
a) Existence of ruins/ cultural property in the project area, if any, their locations.					
(6) Water right/ Common land					
a) Negative influence of the project upon the customary water use such as domestic, industry and agriculture, if any, their present conditions.					
b) Existence of common lands, if any, the sites					
(7) Sanitation					
a) Negative impact given into living environment with project.					
(8) Solid waste					
a) Probability of producing solid waste such as residual soil and water pollution. If any, collection and disposal plan.					
(9) Terrain					
a) Existence of valuable topographies, if any, the sites					
b) Change of them with civil works					
(10) Soil erosion					
a) Probability of soil erosion with land reclamation and clearing forest.					

DATA TO BE COLLECTED ○ : Available , × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(11) Groundwater					
a) Experience of drying up groundwater or groundwater pollution.					
(12) Lake, river					
a) Change of present flowing condition with rehabilitation works.					
(13) Coast land					
a) Existence of littoral sand drift					
b) Existence of coastal erosion					
(14) Ecosystem					
a) Existence of environmentally valuable areas such as mangrove forest, coral reef, tidal land, swamp land. If any, their sites.					
b) Existence of particular areas officially protected such as natural parks and national parks. If any, their sites.					
c) Existence of valuable ecosystem officially protected. If any, their kinds or species.					
(15) Landscape					
a) Existence of important landscape or scenery for tourism or religious. If any, the sites.					
(16) Air pollution					
a) Existence of air pollution. If any, the source.					
(17) Water pollution					
a) Present condition of water quality. If water pollution, the source.					

DATA TO BE COLLECTED

○ : Available , X : Not Available

Data/Item	Availability (○ or X)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
(18) Soil contamination					
a) Existence of soil contamination. If any, the source and degree.					
(19) Land subsidence					
a) Existence of land subsidence with groundwater development.					
6.2 Conformation items					
(1) Works by Japanese Study Team during full-scale study. The following surveys in accordance with Decree of the Minister of Public Works No. 557/KPTS/1989. PIL (Initial Environmental Examination) AMDAL (Environmental Impact Assessment) - Preparation of TOR - Execution of AMDAL					
(2) Works by Public Works after having approval of project implementation. Preparation of the following documents. RKL(Environmental Management Plan) RPL(Environmental Monitoring Plan)					
6.3 Reports or documents to be collected					
(1) Existing data/report of similar projects on Environment Impact Assessment					
(2) As for procedure of environment impact assessment, if there are any Decrees/Regulations to be considered for this study besides the Decree of the Minister of Public Works No. 557/KPTS/1989, their documents/reports.					

DATA TO BE COLLECTED

○ : Available, × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
7. Unit cost and others					
7.1 Installation cost of hydrometeorological equipment					
(1) Installation of rainfall gauge					
(Except supply of rainfall gauge)					
(2) Installation of water level gauge					
(Including installation of well, recorder box, and other accessory works, except supply of level gauge)					
7.2 Boring survey cost					
(1) Core boring (about $\phi 75\text{mm}$)(per meter)					
(2) Standard penetration test (per meter)					
(3) Elastic wave exploration (per km)					
(4) Permeability test					
(5) Standard price for other typical tests with boring survey					
7.3 Cost of laboratory test for soil					
(1) Sampling and transportation					
(2) Unconfined compression test					
(3) Standard price for other typical laboratory tests					
7.4 Survey cost of longitudinal profiling for river (per km) and					
Cross sectioning survey for river (per km)					
Standard interval; 500 m					
Width for sectioning; 200 m					

DATA TO BE COLLECTED

○ : Available, × : Not Available

Data/Item	Availability (○ or ×)	Source	During Preliminary Study	Initial Stage of Master Plan Study	Remarks
7.5 Aerophotogrammetry and mapping (per km ²) Aerialphoto (scale; 25,000) Mapping (scale; 10,000, contour interval; 1.0 m)					
7.6 Aerophotogrammetry and mapping (per km ²) Aerialphoto (scale; 25,000) Mapping (scale; 5,000, contour interval; 1.0 m)					
7.7 Environmental Impact Assessment Survey cost PII (Environmental Information Presentation) survey (1 set) - Personnel expenses - Other necessary cost					
7.8 ANDAL (Environmental Impact Analysis) survey cost (1 set) - Personnel expenses - Other necessary cost					
7.9 Wages of construction workers					
7.10 Ability of contractors on the construction of hydrometeorological station or similar work (1) Business record during the past 5 years (2) Contract cost					
7.11 Ability of contractors on river survey (1) Business record during the past 5 years (2) Contract cost					

5. 面会者リスト

I. SECRETARIATE GENERAL [大臣官房]

1. Drs. Soedarminto Chief, Sub-Division Foreign Aid Administration,
International Cooperation Bureau

II. DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT (DGWRD) [水資源総局]

Directorate of Planning and Programming [計画局]

1. Ir. Djoko S. Sardjono Director of Planning and Programming
2. Ir. Soenarto Soenjojo Chief of Sub-Directorate of River Basin Development Management
3. Ir. Soeharto, Dip. HE Chief of Sub-Directorate of Project Evaluation
4. Drs. Slameto Hadiwiyono Chief of Sub-Directorate of Foreign Aid Administration
5. Drs. Wahyuno, Ms Chief of Survey Section, Sub-Directorate of Planning and Programming
6. Ir. Soeharto Staff of Sub-Directorate of River Basin Development Management

Directorate of Irrigation I [灌漑 I 局]

7. Ir. Harmadi Staff of Sub-Directorate of Planning and Design

Directorate of Rivers [河川局]

8. Ir. Yusuf Gayo Director of Rivers
9. Ir. Soeradji, Dip. HE Chief of Sub-Directorate of Planning and Design
10. Ir. Siswoko, Dip. HE Chief of Sub-Directorate of West Region
11. Ir. Supriana Chief of Survey Section, Sub-Directorate of Planning and Design
12. Ir. Bambang Sigit Chief of Section I Sub-Directorate of PT
13. Ir. Bambang Pinuji Utomo Staff of Sub-Directorate of Planning and Design

Directorate of Swamp [湖沼局]

14. Drs. Basuki Staff of Sub-Directorate of Planning and Programming

III. KANTOR WILAYAH PROPINSI RIAU, DPU [リアウ州公共事業局]

[ブキティンギ]

1. Ir. Pudjihardjo, Dipl. HE Project Manager, Proyek Perbaikan dan Pemeliharaan
2. Garwono Winardi, M.E. Chief of Section in Planning and Design, DPU Prop. Dati I
3. Ir. Mudjijono, Ms Chief of Section of Programming, Kanwil PU Prop.
4. Ir. Heiriyadi, Dipl. H.E. Sub-Project Manager of P2SDA
5. Ir. Haposan Lumban Gaoi Assistant Project Manager for River Project

[レンガット]

1. Ir. Asmara HK Kepala Cabang Dinas PU Prop. Dati I

Kabupaten Indragiri Hulu

2. Asril Kasim, B.E. Kepala Seksi Pengairan, Cabang Dinas Indragiri Hulu

[バカンバルー]

1. Bambang Sudibyo, Kol. CZI-AD Kepala Kantor Wilayah Dep. PU Prop

2. Ir. Ishak Hasan Kepala Sub Dinas Pengairan, DPU Prop.

3. Garwono Winardi, M.E. Chief of Section in Planning and Design, DPU Prop. Dati I

4. Ir. Pudjihardjo, Dipl. HE Project Manager, Proyek Perbaikan dan Pemeliharaan

5. Ir. Heiriyadi, Dipl. H.E. Sub-Project Manager of P2SDA

6. Ir. Mudjijono, Ms Chief of Section of Programming, Kanwil PU Prop.

7. Ir. Herwin A. Lumban Toruan

8. Adi Warman, B.E.

[コタバンジャン]

1. Garwono Winardi, M.E. Chief of Section in Planning and Design, DPU Prop. Dati I

2. Ir. Pudjihardjo, Dipl. HE Project Manager, Proyek Perbaikan dan Pemeliharaan

3. Ir. E.H. Daulay Kepala Cabang Dinas PU Prop. Dati I

Kabupaten Kampar

IV. リアウ州 P L N

1. BB. Joko P. KBPL

2. Benny S. BPL

3. Damroyof PREN

V. BAPPEDA TK. I RIAU

1. Drs. Kamel Kinalli Kepala Bidang Fisik Prasarana

2. Ir. Wan Darusalam, Msc Seksi Pengairan

3. Drs. Nasrun Oenoe Bidang Ekonomi

VI. コタバンジャンダム事務所

1. Ir. Tundjung Witjaksono Project Site Manager

2. Ir. Syamsir Bahar Kabag. Pengendalian Kontrak

VII. 公共事業省水工研究所 (バンドン)

1. Supardiyono Sobirin Head of Administration Division

2. Ir. Carlina Soetjiono, DIPL. H.E. Head of Dissemination Division

VIII. 日本大使館

- | | |
|---------|-------|
| 1. 石川 浩 | 一等書記官 |
|---------|-------|

IX. JICA事務所

- | | |
|-------|-------------|
| 1. 熊谷 | 次長 |
| 2. 高田 | 所員 (建設関係担当) |

X. OECF事務所

- | | |
|-----------|-------|
| 1. 玉石 鍊太郎 | 次席駐在員 |
|-----------|-------|

XI. JICA専門家

- | | |
|----------|-------------------|
| 1. 高橋 透 | 河川局 (砂防) |
| 2. 平川 洋 | 河川局 (電通) |
| 3. 斉藤 俊樹 | 計画局 (灌漑) |
| 4. 大森 信滋 | Cipta Karya (下水道) |
| 5. 海野 仁 | 水工研究所 (防災) |

6. 収集資料リスト

1) 研究開発庁水工研究局

- 1.1 西スマトラ州流観所位置図（関係するもの15ヶ所）
- 1.2 リアウ州流観所位置図（関係するもの25ヶ所）
- 1.3 流観所リスト（西スマトラ州、リアウ州）
- 1.4 気象観測所リスト（西スマトラ州、リアウ州）

2) 計画局流域開発部調査課

- 2.1 流量観測所リスト（流量データ6ヶ所、1970年代のみ）
- 2.2 雨量観測所リスト
- 2.3 ANDALレポート（インドネシア語）

3) 計画局水資源部水文統計課

- 3.1 流量・気象観測所位置図（リアウ州のみ）
- 3.2 流量・気象観測所リスト（リアウ州、西スマトラ州）

4) 水資源総局・湖沼局

- 4.1 インドラギリ川湖沼開発位置図
- 4.2 カンパール川湖沼開発位置図
- 4.3 リアウ州湖沼開発調査書
- 4.4 インドラギリ川潮汐影響地区水理・水文調査報告書（乾期）
- 4.5 インドラギリ川潮汐影響地区水理・水文調査報告書（雨期）
- 4.6 Nucleus Plantation 事業、Kotema-Guntung地区実施設計書
- 4.7 Consulting Services for Interated Swamps Development Project Preparation
(Main Report 英文)

5) 水資源総局・計画局・流域開発部

- 5.1 カンパール川流域水資源開発調査報告書（インドネシア語）

- 5.2 インドネシアの土地改良事業概要
- 5.3 Hydrology Year Books (1985-1991) 抜粋、
発刊 PUSLITBANG(Research Inst. for Water Resources Development)
- 5.4 計画局組織図
- 5.5 Final Report for Hydro Power Potentials Study

- 6) 水資源総局灌漑 I 局
 - 6.1 Potential Irrigation Area (Riau and Sumatera Barat)
 - 6.2 Inventory of Existing Irrigation Projects (リアウ州のみ)
 - 6.3 リアウ州既存灌漑事業地区位置図
 - 6.4 Provincial Irrigated Agriculture Development Project (PIADP)実施予定地区リスト
 - 6.5 Executive Summary / Project Preparation for the PIADP
 - 6.6 スマトラ灌漑開発調査 F/S実施予定地区リスト

- 7) 都市住宅総局上水道局
 - 7.1 Guideline of planning in water supply sector

- 8) リアウ州公共事業局
 - 8.1 リアウ州水文観測所位置図
 - 8.2 リアウ州水文観測所リスト
 - 8.3 雨量データ (13ヶ所)
 - 8.4 気象データ (7ヶ所)
 - 8.5 流量データ (8ヶ所)
 - 8.6 潮位データ
 - 8.7 最近の洪水被害実績調書
 - 8.8 洪水湛水地区位置図
 - 8.9 移住計画位置図
 - 8.10 沼沢地開発事業
 - 8.11 リアウ州灌漑事業位置図

8.12 Existing Provincial Water Supply

8.13 河川改修事業

8.14 工業所分布及び舟運実績

8.15 河川断面（8ヶ所）

8.16 リアウ州開発計画図

1) Poverty Distribution Map

2) Development Promotion Area

3) Flood Prone Area

4) Existing Irrigated Area and Developed Swamp Area

5) Water Resources Development Plan (1994/1995)

6) Proposed Irrigation Area and Swamp Development Area

7) Existing Road Network

8) Proposed Highway Plan (1994/1995)

9) Proposed Highway Plan (PELITA - VI)

10) Existing Settlement (PELITA - V)

11) Settlement Plan (1994/1995)

12) Settlement Plan (PELITA - VI)

8.17 リアウ州森林保護地区位置図

8.18 観光パンフレット

8.19 自然／社会環境条件リスト

8.20 リアウ州県別人口

8.21 リアウ州衛生画像による各種土地利用図

8.22 リアウ州移住計画／実績及び移住先位置図

8.23 レンガット地区放水路路線計画図

9) 西スマトラ州公共事業局

9.1 西スマトラ州水文観測所位置図

9.2 日雨量データ（6ヶ所）

9.3 流量データ（6ヶ所）

9.4 灌漑地区位置図

9.5 灌漑地区面積調書

9.6 インドラギリ川流域（西スマトラ州）現況上水道施設

9.7 Engineering Design Report : Singkarak Hydro Electric Power Project.

9.8 西スマトラ州森林保護地区位置図

9.9 西スマトラ州洪水被害状況図

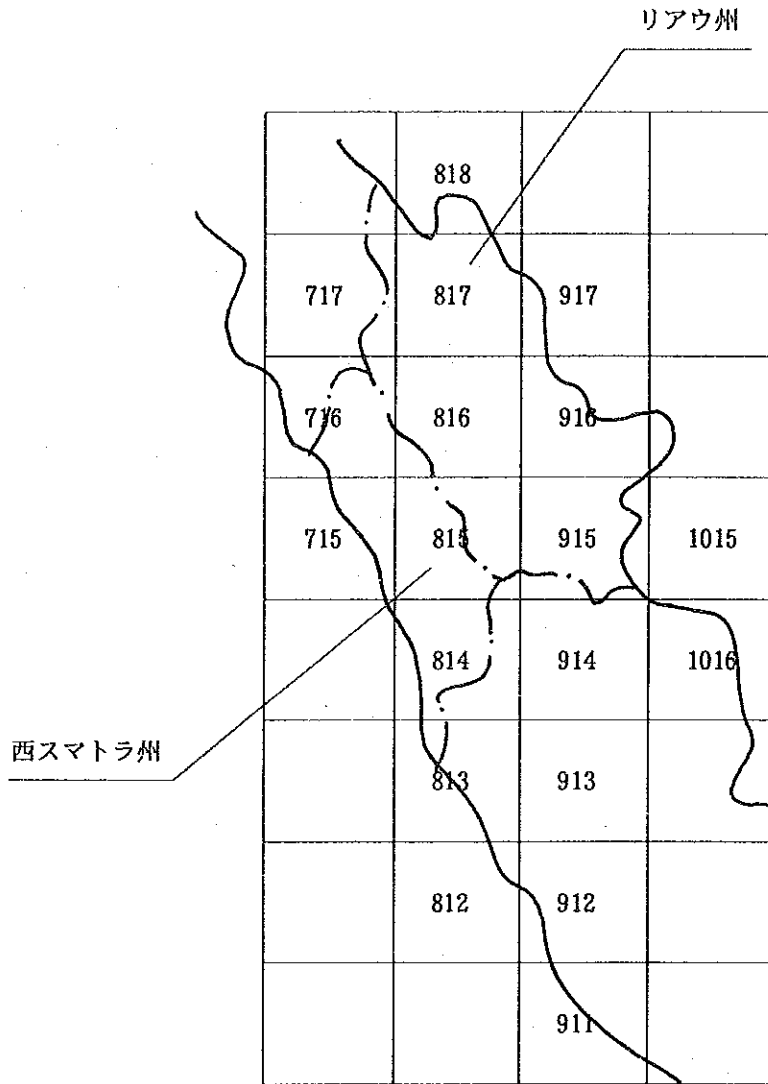
10) 国営電力公社（PLN）州事務所

10.1 発電計画の現状及びビクタバンジャン・ダム建設にかかる補償計画

11) Decree of the Minister of Public Works NO.557/KPTS/1989 on Managing Guideline on Environmental Impact Assessment within the Minister of Public Works

1 2) 地形図 (縮尺 1/250,000) 19枚

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