



DEPARTEMEN PEKERJAAN UMUM  
DIREKTORAT JENDRAL SUMBER DAYA AIR  
BALAI BESAR WILAYAH SUNGAI SUMATERA VIII  
Jl. Kapten Anwar Sastro No. 1251 Telp/Fax (0711) 312272-PALEMBANG

**FINAL REPORT  
ON  
ENVIRONMENTAL IMPACT ASSESSMENT  
FOR  
IRRIGATION DEVELOPMENT AT LEMPUING AREA  
(13,500 HA)**

**1. ENVIRONMENTAL IMPACT ASSESSMENT  
(ANDAL)  
2. ENVIRONMENTAL MANAGEMENT PLAN (RKL)  
3. ENVIRONMENTAL MONITORING PLAN (RPL)**

IN  
SEMENDAWAI TIMUR SUBDISTRICT  
OGAN KOMERING ULU TIMUR DISTRICT  
AND  
LEMPUING AND LEMPUING JAYA SUBDISTRICTS  
OGAN KOMERING ILIR DISTRICT  
SOUTH SUMATERA PROVINCE



PT. ALLES KLAR PRIMA  
PALEMBANG, OCTOBER 2011



## GUBERNUR SUMATERA SELATAN

KEPUTUSAN GUBERNUR SUMATERA SELATAN  
NOMOR : 269 / KPTS / BAN.LH / 2012

### TENTANG

#### KELAYAKAN LINGKUNGAN HIDUP

RENCANA PEMBANGUNAN SALURAN SEKUNDER DAN SUB SEKUNDER PADA AREA IRIGASI  
LEMPUING SELUAS ± 13.500 HEKTAR OLEH BALAI BESAR WILAYAH SUNGAI SUMATERA VIII  
DIREKTORAT JENDERAL SUMBER DAYA AIR KEMENTERIAN PEKERJAAN UMUM  
DI KABUPATEN OGAN KOMERING ULU TIMUR DAN  
KABUPATEN OGAN KOMERING ILIR

### GUBERNUR SUMATERA SELATAN,

- Menimbang : a. bahwa rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum di Kabupaten Ogan Komering Ulu Timur dan Kabupaten Ogan Komering Ilir merupakan usaha dan/atau kegiatan yang wajib dilengkapi dengan Studi Analisis Mengenai Dampak Lingkungan Hidup;
- b. bahwa berdasarkan hasil rapat penilaian oleh Komisi Penilai AMDAL Provinsi Sumatera Selatan tanggal 10 Januari 2012 telah disetujui Analisis Dampak Lingkungan Hidup, Rencana Pengelolaan Lingkungan Hidup dan Rencana Pemantauan Lingkungan Hidup Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum di Kabupaten Ogan Komering Ulu Timur dan Kabupaten Ogan Komering Ilir;
- c. bahwa berdasarkan Peraturan Menteri Negara Lingkungan Hidup Nomor 5 Tahun 2008 tentang Tata Kerja Komisi Penilai AMDAL Pasal 38 ayat (1) butir b, Keputusan Kelayakan Lingkungan Hidup diterbitkan oleh Gubernur untuk dokumen yang telah dinilai oleh Komisi Penilai AMDAL Provinsi;
- d. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a, huruf b, dan huruf c, perlu menetapkan Keputusan Gubernur tentang Kelayakan Lingkungan Hidup Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum di Kabupaten Ogan Komering Ulu Timur dan Kabupaten Ogan Komering Ilir;

- Mengingat : 1. Undang-Undang Nomor 25 Tahun 1959 tentang Pembentukan Daerah Tingkat I Sumatera Selatan (Lembaran Negara Republik Indonesia Tahun 1959 Nomor 70, Tambahan Lembaran Negara Republik Indonesia Nomor 1814);
2. Undang-Undang Nomor 5 Tahun 1990 tentang Konservasi Sumber Daya

3. Undang-Undang Nomor 7 Tahun 2004 tentang Sumber Daya Air (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 32, Tambahan Lembaran Negara Republik Indonesia Nomor 4377);
4. Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 125, Tambahan Lembaran Negara Republik Indonesia Nomor 4437) sebagaimana telah beberapa kali diubah, terakhir dengan Undang-Undang Nomor 12 Tahun 2008 tentang Perubahan Kedua atas Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2008 Nomor 59, Tambahan Lembaran Negara Republik Indonesia Nomor 4844);
5. Undang-Undang Nomor 26 Tahun 2007 tentang Penataan Ruang (Lembaran Negara Republik Indonesia Tahun 2007 Nomor 68, Tambahan Lembaran Negara Republik Indonesia Nomor 4725);
6. Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 140, Tambahan Lembaran Negara Republik Indonesia Nomor 5059);
7. Peraturan Pemerintah Nomor 20 Tahun 2006 tentang Irigasi (Lembaran Negara Republik Indonesia Tahun 2006 Nomor 46, Tambahan Lembaran Negara Republik Indonesia Nomor 4624);
8. Peraturan Pemerintah Nomor 42 Tahun 2008 tentang Pengelolaan Sumber Daya Air (Lembaran Negara Republik Indonesia Tahun 2008 Nomor 82, Tambahan Lembaran Negara Republik Indonesia Nomor 4858);
9. Peraturan Pemerintah Nomor 27 Tahun 2012 tentang Izin Lingkungan (Lembaran Negara Republik Indonesia Tahun 2012 Nomor 48, Tambahan Lembaran Negara Republik Indonesia Nomor 5285);
10. Peraturan Menteri Negara Lingkungan Hidup Nomor 5 Tahun 2008 tentang Tata Kerja Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup;
11. Peraturan Daerah Provinsi Sumatera Selatan Nomor 9 Tahun 2008 tentang Organisasi dan Tata Kerja Inspektorat, Badan Perencanaan Pembangunan Daerah dan Lembaga Teknis Daerah Provinsi Sumatera Selatan (Lembaran Daerah Tahun 2008 Nomor 3 Seri D) sebagaimana telah beberapa kali diubah, terakhir dengan Peraturan Daerah Nomor 2 Tahun 2011 tentang Perubahan Kedua atas Peraturan Daerah Nomor 9 Tahun 2008 tentang Organisasi dan Tata Kerja Inspektorat, Badan Perencanaan Pembangunan Daerah dan Lembaga Teknis Daerah Provinsi Sumatera Selatan (Lembaran Daerah Tahun 2011 Nomor 2 Seri D);
12. Keputusan Gubernur Sumatera Selatan Nomor 629/KPTS/BAN.LH/2010 tentang Pembentukan Komisi Penilai, Tim Teknis dan Sekretariat Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup (AMDAL) Provinsi Sumatera Selatan;

**MEMUTUSKAN :**

Menetapkan :

- KESATU : Kelayakan Lingkungan Hidup yang terdiri dari Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemantauan Lingkungan Hidup (RPL) Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum di Kabupaten Ogan Komering Ulu Timur dan Kabupaten Ogan Komering Ilir.
- KEDUA : Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII sebagaimana dimaksud pada Diktum Kesatu dari aspek lingkungan hidup layak untuk dilaksanakan.
- KETIGA : Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum di Kabupaten Ogan Komering Ulu Timur dan Kabupaten Ogan Komering Ilir, meliputi :
- a. penerapan tenaga kerja untuk pekerjaan konstruksi guna pembangunan saluran sekunder, sub sekunder, dan sarana pendukung (tenaga non skill/semi skill diserap dari tenaga lokal);
  - b. mobilisasi dan demobilisasi material irigasi serta sarana prasarana pendukung;
  - c. kegiatan konstruksi pembangunan daerah irigasi Lempuing meliputi jaringan irigasi sekunder, sub sekunder, dan pembangunan sarana prasarana irigasi serta pembangunan jalan infeksi;
  - d. kegiatan operasi pembangunan jaringan daerah irigasi Lempuing meliputi pelepasan tenaga kerja konstruksi, pengoperasian, pemeliharaan saluran, dan sarana irigasi serta pemanfaatan air irigasi secara optimal.
- KEEMPAT : Balai Besar Wilayah Sungai Sumatera VIII selaku pemrakarsa dalam melakukan kegiatannya wajib memenuhi dan mentaati ketentuan-ketentuan sebagai berikut :
- a. melakukan sosialisasi rencana kegiatan kepada masyarakat yang terkena dampak pada setiap tahapan sebelum pelaksanaan kegiatan dimulai;
  - b. mengutamakan penerimaan tenaga kerja dan kerja sama dengan perusahaan lokal yang sesuai dengan spesifikasi dan kualifikasi yang dibutuhkan dalam pelaksanaan kegiatan serta berkoordinasi dengan pemerintah daerah setempat;
  - c. mengutamakan proses musyawarah mufakat dalam kegiatan pembebasan lahan yang akan dilakukan sesuai peraturan perundang-undangan yang berlaku;

- d. menyiapkan lahan green barrier dengan melakukan perhijauan di sekitiling daerah irigasi terutama bangunan utama dan jaringan irigasi utama serta lokasi ruang terbuka;
- e. memproses perizinan dan mengajukan persetujuan pinjam pakai kawasan hutan sesuai peraturan perundang-undangan yang berlaku apabila lokasi kegiatan melewati/membuka kawasan hutan lindung/kawasan konservasi;
- f. melaksanakan program pengembangan masyarakat sesuai dengan potensi dan aspirasi serta kebutuhan masyarakat setempat berdasarkan hasil kesepakatan yang pelaksanaannya dikoordinasikan dengan pemerintahan daerah setempat;
- g. melaksanakan seluruh ketentuan baik yang tercantum dalam Keputusan ini maupun dalam dokumen Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL), dan Rencana Pemantauan Lingkungan Hidup (RPL);
- h. mengembangkan teknologi dan metode pengelolaan lingkungan hidup dan pemantauan lingkungan hidup yang tercantum dalam dokumen ANDAL, RKL-RPL yang telah dinilai terhadap aspek dampak penting sejalan dengan perkembangan ilmu pengetahuan dan teknologi di bidang perlindungan dan pengelolaan lingkungan hidup;
- i. keputusan kelayakan lingkungan hidup suatu usaha dan/atau kegiatan dinyatakan kedaluwarsa apabila rencana usaha dan/atau kegiatan tidak dilaksanakan dalam jangka waktu 3 (tiga) tahun sejak diterbitkannya keputusan kelayakan ini;
- j. melaporkan hasil pelaksanaan kegiatan pengelolaan lingkungan hidup dan pemantauan lingkungan hidup sesuai Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemantauan Lingkungan Hidup (RPL) kepada Gubernur Sumatera Selatan c.q. Badan Lingkungan Hidup Provinsi Sumatera Selatan, Bupati Ogan Komering Ulu Timur dan Bupati Ogan Komering Ilir setiap 6 (enam) bulan sekali terhitung sejak tanggal ditetapkannya Keputusan ini.

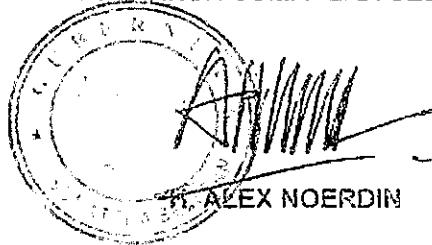
- KELIMA : Instansi pemberi izin wajib mencantumkan segala persyaratan dan kewajiban baik yang tertulis dalam Keputusan ini maupun di dalam Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemantauan Lingkungan Hidup (RPL) sebagai ketentuan dalam izin melakukan rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar oleh Balai Besar Wilayah Sungai Sumatera VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum di Kabupaten Ogan Komering Ulu Timur dan Kabupaten Ogan Komering Ilir.
- KEENAM : Badan Lingkungan Hidup Provinsi Sumatera Selatan, Badan Lingkungan Hidup Kabupaten Ogan Komering Ulu Timur dan Badan Lingkungan Hidup Kabupaten Ogan Komering Ilir melakukan pengawasan terhadap pelaksanaan ketentuan-ketentuan yang wajib dilakukan oleh pemrakarsa sebagaimana dimaksud pada Diktum Kelima.

- KETUJUH Apabila berdasarkan hasil laporan pelaksanaan pengawasan tentang ketentuan izin sebagaimana dimaksud pada Diktum Keenam :
- a timbul dampak lingkungan hidup di luar pertencanaan dan perkiraan yang tercantum dalam Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemanfaatan Lingkungan Hidup (RPL) yang telah disetujui, segera melaporkan kepada Gubernur Sumatera Selatan c.q Badan Lingkungan Hidup Provinsi Sumatera Selatan, Bupati Ogan Komering Ulu Timur dan Bupati Ogan Komering Ilir untuk diambil langkah-langkah penyelesaian yang diperlukan;
  - b terjadi perluasan, pemindahan dan/atau perubahan desain dan/atau proses dan/atau kapasitas dan/atau bahan baku dan/atau bahan penolong, terjadi bencana alam dan lainnya yang menyebabkan dokumen Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup (RKL) dan Rencana Pemanfaatan Lingkungan Hidup (RPL) tidak sesuai lagi sebagai acuan pengelolaan dan pemantauan lingkungan hidup atau perubahan lingkungan yang sangat mendasar baik sebelum maupun saat pelaksanaan kegiatan, maka pemerintah wajib membuat Analisis Mengenai Dampak Lingkungan Hidup (AMDAL) yang baru.

KEDELAPAN : Keputusan ini mulai berlaku pada tanggal ditetapkan dengan ketentuan bahwa segala sesuatunya akan diubah dan diperbaiki kembali sebagaimana mestinya apabila di kemudian hari ternyata terdapat kekeliruan dalam Keputusan ini.

Ditetapkan di Palembang  
pada tanggal 30 Maret 2012

GUBERNUR SUMATERA SELATAN,



Tembusan

- 1 Menteri Dalam Negeri RI di Jakarta
- 2 Menteri Negara Lingkungan Hidup RI di Jakarta
- 3 Bupati Ogan Komering Ulu Timur di Martapura
- 4 Bupati Ogan Komering Ilir di Kayuagung
- 5 Kepala Dinas Pekerjaan Umum Pengairan Provinsi Sumsel di Palembang
- 6 Kepala Badan Lingkungan Hidup Provinsi Sumsel di Palembang



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SOUTH SUMATERA PROVINCE**



**PT. ALLES KLAR PRIMA  
PALEMBANG, OCTOBER 2011**

# PREFACE

One of requirement needed to implement secondary and sub-secondary canal development at Lempuing Irrigation Area by Balai Besar Wilayah Sungai Sumatera VIII as the activity initiator is composing of Environmental Impact Analysis (AMDAL) Document.

AMDAL document composing is started by composing Term of Reference of AMDAL (KA-ANDAL) that had been implemented. It is followed by composing AMDAL Document, Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL). This AMDAL Document is also composed to fulfill the obligatory as declared in Ordinance No. 32/2009 related to Environmental Protection and Management which is in detail can be found in Government Regulation No. 27/1999 related to Environmental Management Plan as well as Environmental State Ministry Regulation No. 11/2006 related to Type of Effort and/or Activity Plan that should be equipped with AMDAL Document. AMDAL Document composing is substantially refers to Environmental State Ministry Regulation No.08/2006 related to AMDAL Composing Guideline.

For the improvement of this ANDAL, RKL and RPL documents, we hope to receive the direction and fulfillment by AMDAL Commission of South Sumatra Province as one important guideline in conducting the secondary and sub-secondary canal development at Lempuing Irrigation Area.

We sent our acknowledge to all parties that had already helped in composing this Document.



# **ABSTRACT**

Development activity of Lempuing irrigation network with an objective to increase the land function from rainfed paddy field into technical irrigation paddy field through irrigation and drainage channels development will be conducted and covering area of ± 13.500 ha with additional water source from Ranau Lake. It is hoped that this activity can increase agricultural production, especially rice, so that it can improve the economic condition and welfare level of community in this area.

Land at Lempuing irrigation development area is consisted of paddy field land (50%), rubber plantation (38%), settlement (10%) and underbrush (2%). This area is bordered on Lempuing River at North and East sides. Macak and Belitang Rivers are located at South side, whereas Burnai River is located at West side. Lempuing irrigation development area that can irrigate paddy field with magnitude of 13,500 ha is administratively belonging to Semendawai Timur Subdistrict in OKU Timur District as well as Lempuing and Lempuing Jaya Subdistricts in OKI District (Kementerian PU, 2011).

This activity is parallel and not in contradiction based on Government Regulation No. 26/2008 related to National Space Allotment Plan. It is also appropriate based on Area Space Allotment Plan of OKI and OKU Timur Districts. The proposed activity plan is consisted of Pre-Construction Stage (Extension Service/Socialization, Survey, Investigation and Design as well as Land Exemption/land compensation affected by channel); Construction Stage (Construction Manpower Recruitment, Equipments and Materials Mobilization and Irrigation Channel Development) and Operational Stage (Construction Manpower Severance, Operation and Maintenance of Channel/Irrigation Facilities as well as Optimum Utilization of Irrigation Water).

Irrigable land area is consisted of paddy field land with area of 10,242 ha and land which is potential to be changed into paddy field land with area of 3,258 ha. Irrigation channel system at Lempuing area that will be built is consisted of Secondary Channel and Sub-Secondary Channel which are covered in the study.

Irrigation channel development activity has potential to produce the change of landscape condition and basic change toward environmental components. Therefore, analysis related to produced impacts during on going activity should be conducted. This analysis is used to determine the environmental condition after and before the activity implementation so that proper measure can be taken to minimize the negative impact produced from this activity.

Secondary and Sub-secondary channels development can produce impact. The important impact coverage is consisted of identification and evaluation that are conducted at all activity stages. Impacts that affect the Physico-Chemical Components are consisted of Air Quality and Noise, Surface Water Quality, Hydrology, Space, Land and Soil. Impacts that have effect on Biological Components are Vegetation and Wildlives as well as Waters Biota. Impacts that have effect on Socioeconomic, Cultural and Community Health Components are Job Opportunity, Business Opportunity, Local Economy, Transportation and Road Damage, Community Health and Community Perception.

Based on the study results of Environmental Impact Analysis toward activity plan of Secondary and Sub-Secondary Channels Development at Lempuing area, it is known that this activity will have impacts on environmental components either important positive impact or important negative impact. Important negative impact from activity plan should be minimized or even omitted if possible, whereas important positive impact should be developed. Environmental management and environmental monitoring programs are composed to anticipate the probable occurrence of important negative impact. Therefore, Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL) are composed as integrated part of Environmental Impact Analysis (ANDAL) document parallel to the stated current regulation.

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ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**CHAPTER I  
INTRODUCTION**

# CHAPTER I

## INTRODUCTION

### 1.1. Background

Continuous utilization of natural resources in Indonesia has been made to improve the community welfare in all areas of Republic of Indonesia and natural resources utilization is recently increasing due to the increase in population. Meanwhile, increase in population creates the new challenge, i.e. limitation of land area available for settlement and agricultural purposes.

The current development and utilization of either swamp land or non-swamp land is one of the effort made by government to increase agricultural production. It is expected that food crop production, especially rice, can be increased through agricultural area extension to fulfill the demand of food which is recently increased due to relatively rapid increase in population.

The government also implemented the agricultural intensification program to increase the crop production in addition to the area extension program. This agricultural intensification program is closely related to Panca Usaha Tani program in which the irrigation is prerequisite to get the maximum agricultural production. Under these circumstances and to achieve the target, the government through Directorate General of Water Resources Development, Department of Public Works, has issued letter No.180/KPTS/A/1990 to establish a committee for the implementation of Komering Irrigation Project with irrigation area of 120,000 ha.

Komering Irrigation Project has been commenced in 1990 with the rehabilitation and improvement of Belitang Irrigation Area of about 21,000 ha as the Stage I development including the construction of Perjaya Headworks, Komering Main Canal and Ranau Regulating Facility. This Stage I was completed by 1997 and the Stage II development including North Komering Irrigation Area (16,640 ha), South Komering Irrigation Area (10,931 ha) as well as Bahuga Irrigation area and Muncak Kabau Irrigation Area (6,021 ha) has been commenced consecutively.

Development of Lempuing irrigation system (hereinafter referred as the project) of 13,500 ha is one of the development activities under Komering Irrigation Project.

The purpose of the project is to improve the function of the land from a rain-fed paddy field to a technical irrigated paddy field through the development of irrigation and drainage canals using the additional water resource from Ranau Lake. The project is expected to improve the economic conditions and well-being of the surrounding communities through an increase of agricultural production, especially of rice. Current annual rice production is only 1 ton/ha and is expected to increase to 6 to 8 tons/ha.

Increase of food production by increasing land area coverage, especially through paddy field development, had already been conducted. Paddy field reclamation with construction of irrigation facilities has changed the landscape and might cause the significant change in environmental components. Therefore, environmental impact assessment should be made for the on-going activity. This assessment will be used to confirm the environmental conditions before and after those activities in order to minimize the probable negative impacts resulting from these activities.

The above activity is in accordance to Regulation No.32/2009 in term of Environmental Protection and Management as a reference for maintaining the environmental function. Environmental sustainable development should be secured in accordance with Regulation of Government of the Republic of Indonesia N0. 27/1999 and Regulation of Environmental State Ministry No. 11/2006 related to preparation of Environmental Impact Assessment (AMDAL). Pursuant to those Regulations, environmental impact assessment study should be conducted to identify the probable impacts so that the negative impacts can be prevented or minimized and positive impacts can be developed. The study of environmental impact assessment was conducted for the project on the development of Lempuing Irrigation Scheme in order to confirm the probable impacts and to plan the integrated environmental management efforts either for the probable impacts within the project or for the impacts in relation to other activities in the surrounding areas.

The Environmental Impact Assessment (ANDAL) Document was prepared based on Regulation of Environmental State Ministry No. 08/2006, Guidelines of Environmental Impact Assessment and Decree Letter from Head of Environmental Impact Control Council (Bapedal) No. 08/2000 related to Community Involvement and Information Disclosure during the implementation of Environmental Impact Assessment. The study is expected to identify and evaluate and establish the management effort plan as a

reference for initiator or related institutions/councils concerning to the project, especially for the determination of the environment management policy at project site or surrounding areas.

The documents of Environmental Impact Assessment study consists of Term of Reference for Environmental Impact Assessment (KA-ANDAL), Environmental Impact Assessment (ANDAL), Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL). For the smooth implementation of this Environmental Impact Assessment Study, Term of Reference for Environmental Impact Assessment was previously prepared as a reference for all parties in conducting the project and to provide the necessary data and information to the related parties as well.

## **1.2. Objective and Benefit of the Project**

### **1.2.1. Project Objectives**

The objectives of the project are as follows:

- 1) Effective use of available water resources in Komering River for agricultural purposes.
- 2) To fulfill irrigation water requirement to improve the agricultural cultivation at paddy field in Lempuing area.
- 3) To increase the agricultural production, especially of rice, through the improvement of Cropping Intensity.
- 4) To increase the community income and push ahead with the economic growth in the area.

### **1.2.2. Project Benefit**

- 1) Increase employment in agricultural sector which results in the decrease of unemployment.
- 2) Increase of agricultural production, especially food crops, which contributes to increase the community income.
- 3) Increase of job opportunity at agricultural sector and other related sectors.
- 4) Increase of economic activities and improvement of community welfare.

### 1.3. Regulations

Regulations used as a reference in composing Term of Reference of Environmental Impact Assessment are as follows:

| <b>Regulations</b>   | <b>Relevance to the Activity</b>  |
|--|---|
| <b>1.3.1. Ordinances</b>   |   |
| 1) Ordinance No. 5/1960 related to Basic Regulation of Agrarian Base.  | Reference and judicial base for activities in agrarian sector.  |
| 2) Ordinance No. 20/1961 related to right cancellation of land and matters above the land.                   | Reference of right cancellation of land and matters in the surrounding of irrigation project.   |
| 3) Ordinance No. 1/1970 related to Working Safety.   | Activity implementation reference for manpowers safety involved in activity.  |
| 4) Ordinance No. 7/1981 related to manpower report obligation in a company.                                  | Implementation reference in which the activity operator should make a report related to manpower condition.   |
| 5) Ordinance No. 5/1990 related to Conservation of Natural Biological Resources and its Ecosystem.           | Activity implementation reference in which all development activities should maintained natural biological resources and its ecosystem so that it produces the balance development. |
| 6) Ordinance No. 3/1992 related to Social Assurance for Manpowers.   | Reference and judicial base in which the activity operator should take into account the social condition of manpowers.  |
| 7) Ordinance No. 13/2003 related to Manpower.  | As reference for the obligation of activity operator in term of manpower.   |
| 8) Ordinance No. 2/2004 related to Solution of Industrial Relationship Dispute.                              | Related to activity of manpowers recruitment and utilization.   |
| 9) Ordinance No. 7/2004 related to Water Resources.  | Reference for utilization and conservation of water resources.  |
| 10) Ordinance No. 26/2007 related to Space Allotment.  | Reference for the equilibrium between development and area space allotment that produce balance condition between environmental development and community life order.               |
| 11) Ordinance No. 12/2008 related to the second change of Ordinance No. 32/2004 in term of Local Government. | Reference for development policy and implementation in local area.  |
| 12) Ordinance No. 22/2009 related to Traffic and Road Transportation.  | Reference of obligation related to inland road utilization in supporting the operational activities.  |
| 13) Ordinance No. 32/2009 related to Environmental Protection and Management.                                | Reference for target achievement of environmental management which produce a balance between human and its environment, wise resources utilization and                              |

| <b>Regulations</b>   | <b>Relevance to the Activity</b>  |
|--|---|
|  | achievement of the environmental function.  |
| 14) Ordinance No. 36/2009 related to Health.   | Activity implementation reference in which all development activities should take into account the balance condition and health care.                                   |
| 15) Ordinance No. 41/2009 related to Protection for Sustainable Food Agricultural Land.  | As a base related to Lempuing irrigation area as Sustainable Food Agricultural Land.  |
| <b>1.3.2. Government Regulation</b>  |   |
| 1) Government Regulation No. 14/1987 related to Delivery of Part of Central Government Affair in Public Works into Local Government (Government Official Gazette of Indonesia Republic No. 25/1987, Additional Government Official Gazette of Indonesia No. 3353); | Reference for development policy and implementation at local area according to the proportion of local government authority.  |
| 2) Government Regulation No. 7/1999 related to Protection of Plants and Wildlives.   | Reference for plants and wildlives protection.  |
| 3) Government Regulation No. 27/1999 related to Environmental Impact Assessment.   | Reference or law base for composing of environmental document that is mandatory for activity which may results in significant and important impacts toward environment. |
| 4) Government Regulation No. 41/1999 related to Air Pollution Control.   | Environmental quality standard for ambient air quality of development activity.   |
| 5) Government Regulation No. 82/2001 related to Water Quality Management and Water Pollution Control.  | Environmental quality standard for water quality of receiving water bodies in the surrounding area of development activity.   |
| 6) Government Regulation No. 74/2001 related to Management of Dangerous and Toxic Substances.  | Reference for management of dangerous and toxic substances.   |
| 7) Government Regulation No. 16/2004 related to Land Use.  | Reference for space allotment and land use.   |
| 8) Government Regulation No. 08/2006 related to Composing Guideline for Environmental Impact Assessment.   | Reference for Document Composing of Environmental Impact Assessment.  |
| 9) Government Regulation No. 20/2006 related to Irrigation.  | This activity is related to irrigation activity implementation that should refers to this regulation.   |

| <b>Regulations</b>  | <b>Relevance to the Activity</b>  |
|---|---|
| 10) Government Regulation No. 38/2007 related to Government Affairs Distribution amongst Central Government, Local Government and District/City Government.                   | Reference for development policy and implementation at area according to government affairs and their authority proportion.   |
| 11) Government Regulation No. 26/2008 related to Space Allotment Plan at National Territory.  | Reference for balancing condition between development and space allotment as well as balance condition between environmental development and community life order.  |
| 12) Government Regulation No. 42/2008 related to Water Resources Management.  | Reference for utilization and conservation of water resources.  |
| 13) Government Regulation No. 38/2011 related to River.   | Reference for utilization of the existing rivers because rivers are one of natural resources that have multi functions for human life so that efforts to protect, develop, use and control of rivers should be referred to this regulation. |
| <b>1.3.3. Presidential Decree</b>   | <b>Relevance to the Activity</b>  |
| 1) Presidential Decree No. 4/1980 related to Report Obligation of Job Vacancy.  | Implementation reference for manpower recruitment.  |
| 2) Presidential Decree No. 32/1990 related to Management of Protection Area.  | Implementation reference for conservation activities at protection area either for an area that give protection for lower area or local area protection, wildlife reserve and cultural preserve areas well as prone natural disaster area.  |
| 3) Presidential Decree No. 10/2000 related to Council of Environmental Impact Control.  | Reference for environmental impact control activity.  |
| 4) Presidential Decree No. 34/2003 related to National Policy for Land Sector.  | Regulating implementation reference for land authorizing, ownership and utilization in order to provide land law order, land administrative, land utilization and environment maintenance resulting in law assurance in land sector.        |
| 5) Presidential Decree No. 65/2006 related to the change of Presidential Decree No. 36/2005 which refers to Land Provision for Development Implementation for Public Benefit. | Regulating implementation reference for land authorizing, ownership and utilization in order to provide land law order, land administrative, land utilization and environment maintenance resulting in law                                  |

| <b>Regulations</b>  | <b>Relevance to the Activity</b>   |
|---|--|
|   | assurance in land sector.  |
| <b>1.3.4. Decree/ Ministry Regulation/ Council</b>  |  |
| 1) Health Minister Regulation No. 173/Men.Kes/Per/VIII/77 in term of Water Pollution Control for Several Usages which related to Health.  | General guideline for development implementation in term of Water Pollution Control for several usages which related to Health.  |
| 2) Minister Decree of Manpower and Public Work No. 174/1986 in term of Work Health and Safety.  | Implementation general guideline for work safety and health at construction activity site.   |
| 3) Health Minister Regulation No. 416/Men.Kes/Per/IX/1990 related to Clean Water.   | These are threshold value of parameters for clean water standard and supervision which are related to intial water quality condition at surrounding activity location. |
| 4) Health Minister Regulation No. 107/1990 related to Standard and Supervision of Water Quality.  |  |
| 5) Public Work Minister Regulaion No. 57/PRT/1991 in term of Delivery Implementation Guideline for part of Central Government Affairs in Public Works Sector into Provincial Government and District/City Government. | As Delivery Implementation Guideline for part of Central Government Affairs in Public Works Sector into Provincial Government and District/City Government.            |
| 6) Manpower Minister Decree No. 2/1993 related to Work Agreement of Specific Time Period.   | Reference for manpower utilization in construction activity.   |
| 7) Manpower Minister Decree No. 72/MEN/1994 related to Calculation Base for Overtime Pay.   | Reference for manpower utilization in construction activity.   |
| 8) Decree of Head of Environmental Impact Control Council (Bapedal) No. 056/1994 related to Guideline of Important Impact Measure.  | Reference for conducting the potential impact assessment from activity.  |
| 9) Environmental Minister Decree No. 48/1996 related to Quality Standard of Noise Level.  | This is the prerequisite of threshold value of parameters and noise level supervision at surrounding activity location.  |
| 10) Decree of Head of Environmental Impact Control Council (Bapedal)/Environmental State Ministry No.299/II/1996 related to Technical   | Reference for Social Aspect Study in Composing of Environmental Impact Assessment.   |

| <b>Regulations</b>   | <b>Relevance to the Activity</b>   |
|--|--|
| Guideline for Social Aspect Study in Composing of Environmental Impact Assessment.   |  |
| 11) Decree of Head of Environmental Impact Control Council (Bapedal) No. 124/12/1997 related to Guideline for Community Health Aspect Study in Composing of Environmental Impact Assessment. | Reference for Community Health Aspect Study in Composing of Environmental Impact Assessment.   |
| 12) Environmental Ministry Regulation No. 41/1999 related to Air Pollution Control.  | This is the prerequisite of threshold value of parameters and air quality supervision at surrounding activity location.                    |
| 13) Manpower Ministry Regulation No. 01/Men/1999 related to Minimum Wage.  | Reference for manpower utilization in construction activity.   |
| 14) Agraria Minister Regulation/Head of National Land Council No. 2/1999 related to Location Permit.   | This is an important base to start a business in which the main priority of location permit will be given to certain areas and activities. |
| 15) Decree of Environmental State Ministry No.2/2000 related to Assessment Guideline for Environmental Impact Assessment Document.   | Reference for document composing in term of document assessment and improvement by technical commission team.                              |
| 16) Decree of Head of Environmental Impact Control Council (Bapedal) No. 8/2000 related to The Community Involvement and Information Openness in Process of Environmental Impact Assessment. | Reference for each activity that should be based on openness of information in relation to Environmental Impact Assessment Composing.      |
| 17) Decree of Environmental State Ministry No. 40/2000 related to Working Procedure Guideline Assessment Commission of Environmental Impact Assessment.                                      | Reference for document composing in term of document assessment and improvement by commission team.  |
| 18) Decree of Environmental State Ministry No. 17/2001 related to Type of Business Plan and/or Activity that should be equipped with Environmental Impact Assessment.                        | Reference for proposed document type according to the probable potential impact as a results of activity.                                  |
| 19) Decree of Health Minister No.876 / Menkes / SK / VIII / 2001 related to Technical Guideline of Environmental   | Reference for Environmental Health Impact Assessment.  |

| <b>Regulations</b>  | <b>Relevance to the Activity</b>  |
|---|---|
| Health Impact Assessment.   |   |
| 20) Decree of Environmental State Ministry No. 45/2005 related to Technique of Composing and Reporting Techniques of Environmental Management Plan (RKL) and Environment Monitoring Plan (RPL). | Reference for Composing and Reporting Techniques of Environmental Management Plan (RKL) and Environment Monitoring Plan (RPL).        |
| 21) Environmental State Ministry Regulation No. 8/2006 related to Composing Guidelines for Environmental Impact Assessment.   | Reference for Composing of Environmental Impact Assessment.   |
| 22) Environmental State Ministry Regulation No. 11/2006 related to Type of Business Plan and/or Activity that should be equipped with Environmental Impact Assessment.                          | Reference for proposed document type according to the probable potential impacts as a results of activity.                            |
| 23) Public Works Minister Regulation No. 30/PRT/M/2007 Guidelines for Development and Management of Participative Irrigation System.  | Reference for Development and Management of Participative Irrigation System.  |
| 24) Health Minister Regulation No. 492/2010 related to Revision of Clean Water Management.  | Reference for clean water management related to potential decrease of water quality due to the activities.                            |
| 25) Manpower and Transmigration Ministry Regulation No. 13/Men/2011 related to chemical and physical threshold limit of working environment.  | Reference for manpower utilization in construction activity.  |
| <b>1.3.5. Governor Regulation/ Local Regulation of South Sumatra Province</b>   |   |
| 1) Decree Letter of South Sumatra Province Governor No. 522.5/3317/XI/1990 date of 18 March related to Obligation to Conduct the Environmental Impact Assessment.                               | Reference for composed document type according to probable potential impacts due to activities.                                       |
| 2) Regulation of South Sumatra Province Governor No. 15/2005 related to Quality Standard for Static Emission and Threshold Limit for Exhaust Gas from Motor Vehicles.                           | Reference for air pollution control from static and dynamic sources of activity.  |
| 3) Regulation of South Sumatra Province Governor No. 16/2005 related to Water Allotment and River Water Quality   | Reference for using and utilizing river water which involve many people life so that its quality should be maintained for the benefit |

| <b>Regulations</b>  | <b>Relevance to the Activity</b>  |
|---|---|
| Standard.   | of human life and other living organisms.   |
| 4) Regulation of South Sumatra Province Governor No. 17/2005 related to Quality Standard of Ambient Air and Noise Level.  | This is related to main parameters of air quality and noise level due to development activity.  |
| 5) Regulation of South Sumatra Province Governor No. 17/2005 related to Liquid Waste Quality Standard for Activities of Industry, Hotel, Hospital, Domestic and Coal Mining.  | Reference for quality standard requirement of liquid waste in industrial activities.  |
| 6) Local Government Regulation of South Sumatra Province No. 14/2006 related to Space Allotment of South Sumatra Area for year of 2005-2019.  | Reference for balancing condition between development and space allotment as well as balance condition between environmental development and community life order.  |
| 7) Regulation of South Sumatra Province Governor No. 25/2009 related to Tariff Guidelines for Compensation of Land and Growing Plants as well as Buildings due to Exploration Activity, Exploitation of State Owned Business, Local Government Owned Business, and other Private Companies. | Reference for land exemption for development activities.  |
| 8) Local Government Regulation of South Sumatra Province No. 21/2010 related to Irrigation.   | Reference for Lempuing irrigation development.  |
| 9) Decree of South Sumatra Province Governor No. 825/KPTS / Disnakertrans /2011 related to Sectoral Minimum Wage of South Sumatra Province in year of 2012.   | Reference for manpower utilization in activities.   |
| 10) Decree of South Sumatra Province Governor No. 774/KPTS/BAN LH/2011  | Reference for Composing of Environmental Impact Assessment, Environmental Management Plan and Environmental Monitoring Plan as well as Development of Secondary and Sub-Secondary Channels at Lempuing Irrigation Area. |
| <b>1.3.6. Local Government Regulation of OKI and OKU Timur Districts</b>  |   |
| 1) Local Government Regulation of OKI District No. 13/2003 related to Permit Delivery and Retribution for Building and Road Construction.   | Reference for permit acquisition to conduct the activities.   |

| <b>Regulations</b>   | <b>Relevance to the Activity</b>   |
|--|--|
| 2) Local Government Regulation of OKU Timur District No. 16/2005 related to Building Construction Permit.  | Reference for permit acquisition to conduct the activities.  |
| 3) Local Government Regulation No. 16/2006 related to Development of Semendawai Timur Subdistrict, OKU Timur District.   | Reference and Yudicial Base for Semendawai Timur Subdistrict, OKU Timur District.  |
| 4) Local Government Regulation of OKU Timur District No. 27/2006 related to Permit of Waste Water Disposal and Utilization.  | Reference for Permit of Waste Water Disposal and Utilization.  |
| 5) Local Government Regulation of OKU Timur District No. 9/2008 related to Report Obligation of Job Vacancy.   | Reference for manpower utilization in activities.  |
| 6) Local Government Regulation of OKU Timur District No. 10/2008 related to Report Obligation of Local Manpower, Regional Manpower and Foreign Manpower.                                   | Reference for manpower utilization in activities.  |
| 7) Local Government Regulation of OKU Timur District No. 31/2008 related to Long Term Development Plan (RPJP) of OKU Timur District for year of 2005-2025.                                 | Reference for activities implementation in accordance to Long Term Development Plan (RPJP) of OKU Timur District.  |
| 8) Local Government Regulation of OKU Timur District No. 33/2008 related to the Environmental Cleanliness, Beauty, Order and Health.   | Reference for balancing condition between development and space allotment as well as balance condition between environmental development and community life order. |
| 9) Local Government Regulation of OKU Timur District No. 3/2009 as substitute of Local Government Regulation No. 40/2007 in relation to 61 Villages Development within OKU Timur District. | Reference and yudicial base for 61 Villages within OKU Timur District.   |

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**CHAPTER II**  
**EFFORT AND/OR ACTIVITY PLAN**

# **CHAPTER II**

## **Project Activity Plans**

### **2.1. Identity of Executing Agency and Study Team for Environmental Impact Assessment Study**

- 1) Name : Satker Balai Besar Wilayah Sungai VIII
- 2) Address : Jl. Kapten Anwar Sastro No. 1251 Palembang
- 3) Director : Ir. Soekotjo Tri Sulistyo, Dipl. HE
- 4) Position : Kepala Balai Besar Wilayah Sungai Sumatera VIII
- 5) Head of Study Team : Ir. Satria Jaya Priyatna, M.S.

Table 2.1 presented the specialty and qualification of study team members. Biodata of head and members of composer team are shown in Appendix.

**Table 2.1. Team Composition of Environmental Impact Assessment (ANDAL) Study at Lempuing Irrigation Development.**

| No | Name/<br>Position in Team                           | Specialty                 | Remarks   |
|----|---|---------------------------|---|
| 1. | Ir. Satria Jaya Priyatna, MS /Team Leader           | Soil and Water            | Amdal Penyusun dan Sertifikasi Kompetensi Ketua Penyusun Amdal No. 000415/SKPA/LSK-INTAKINDO/III/2011   |
| 2. | Dr. Ir. Yakup Parto, MS                             | Agronomist                | Amdal Penyusun dan Sertifikasi Kompetensi Ketua Penyusun Amdal No. 00041/SKPA/LSK-INTAKINDO/III/2010    |
| 3. | Dr. Indra Yustian, M.Si/Head of Biological Team     | Biology                   | Amdal Penyusun dan Sertifikasi Kompetensi Ketua Penyusun Amdal No. 000213/SKPA/LSK-INTAKINDO/VIII/2010  |
| 4. | Drs. Mulyanto, MA/Head of Socioeconomic and Culture | Socioeconomic and Culture | Amdal Penyusun dan Sertifikasi Kompetensi Anggota Penyusun Amdal No. 000417/SKPA/LSK-INTAKINDO/III/2011 |
| 5. | Ir. Evi Afiatun M.T.                                | Environmental Engineering | -   |
| 6. | Drs.Kiswadi   | Irrigation/ Pengairan     | -   |
| 7. | Ir.Sarino   | Hydrology                 | -   |

## **2.2. Project Conditions and Area**

Project area of Lempuing irrigation system is located at southeast part of South Sumatra Province. Project area is about 200 km<sup>2</sup> stretched from 3°46' to 3°57' South Latitude and 104°49' to 104°58' East Longitude. The purpose of the project is to improve the function of the land from a rain-fed paddy field to a technical irrigated paddy field through the development of irrigation and drainage canals using the additional water resource from Ranau Lake, diverted at Perjaya Headworks and through Belitang Secondary Canal. The project is expected to improve the economic conditions and well-being of the surrounding communities through an increase of agricultural production, especially of rice.

Present land use of Lempuing area is paddy field land (50%), rubber plantation (38%), settlement (10%), and underbrush (2%). This area is bordered on Lempuing River flood plain at the north and east sides. Macak and Belitang Rivers are located at South side, whereas Burnai River is located at West side. Lempuing area with 13,500 ha of irrigable paddy fields is administratively located in Semendawai Timur Subdistrict of OKU Timur District, and Lempuing and Lempuing Jaya Sub-districts of OKI District (Kementerian PU, 2011). This project can be judged as appropriate and consistent according to the Government Regulation No. 26/2008 related to National Land Use Plan as well as the Land Use Plan of OKI and OKU Timur areas. The project activities to be implemented can be broadly described as follows:

### **I. Pre-Construction Stage**

1. Social services/socialization,
2. Survey, investigation and design, and
3. Land acquisition/land compensation required for canal and structure construction

### **II. Construction Stage**

1. Mobilization / Recruitment of Manpower for Construction Works
2. Mobilization and Demobilization of Equipments and Materials
3. Construction Works

### **III. Operation Stage**

1. Disemployment / Demobilization of Manpower for Construction Works
2. Operation and Maintenance of Irrigation Facilities
3. Optimal Utilization of Irrigation Water (Water Management)

#### IV. Post Operation Stage

1. Removal/Transfer of Canals and Irrigation Facilities
2. Manpower Management

#### **2.2.1. Pre-Construction Stage**

##### **2.2.1.1. Social Service/Socialization**

Prior to commencement of the construction works, the project activity should be recognized by the community peoples or other related parties which will be affected by project impacts. Therefore, the initiator had conducted the social services to explain the proposed project activities, the expected benefits from the project and the responsibility of the project initiator to develop the irrigation canal network. The social service had been made directly to village community members or indirectly through village officers.

Lempuing irrigation development is the extension from the existing Belitang irrigation system which is under operation. The MoU (*Minutes of Understanding*) between Ministry of Public Works and OKI District Government related to Lempuing irrigation development with covering area of 13,500 ha has been already exchanged and signed by both parties (Ministry of Public Works, 2011). Permit process for location determination received from South Sumatra Province Governor at pre-construction stage will also be done by using land affairs consideration from National Land Affairs Council of South Sumatra Province.

Socialization for project activities, especially related to preparation of Environmental Impact Assessment (AMDAL) document, had been made directly to the relevant authorities and/or community people on 27 April 2011 and through notification at Sriwijaya Post newspaper on 3 March 2011 as per attached. It is expected that community perception would be positive as they recognize the importance of irrigation canal development project on improvement of their community welfare through these social service/socialization activities.

### **2.2.1.2. Survey, Investigation and Design**

The project initiator had already conducted survey and investigation to determine the feasibility of paddy field development and irrigation network in year of 2008 before the implementation of Irrigation Network Development Project (Ministry of Public Works, 2011). The results of survey and investigation include the information/data related to topography, climate, water resources, and land use as well as infrastructures such as described in Chapter III.

### **2.2.1.3. Land Acquisition/Land Compensation due to Canal Development**

Land compensation which is affected by secondary canal development will be done through land compensation mechanism or land use agreement by using compensation method conducted by specific team and based on ownership evidence. The team will consist of District Government officers, Subdistrict Government officers, Village officers, land owners from community as well as the officers from other relevant institutions by taking into account the aspiration from local community.

Land acquisition should be made always referring to the MOU mentioned above and South Sumatra Governor Regulation No. 25/2009 related to guideline of compensation value for each land use, growing plant and building on the land.

## **2.2.2. Construction Stage**

### **2.2.2.1. Recruitment of Construction Manpower**

Construction of irrigation canals and those related structures, inspection roads, etc. will be implemented during the construction works. Many labors will be required and recruited for the construction works. Local manpower especially from villages in the nearby of irrigation canal development which fulfill certain expertise and skill is shown in Table 2.2.

**Table 2.2. Estimated Requirement of the Contractor Manpower at Construction Stage**

| <b>No.</b>   | <b>Expertise</b>                             | <b>Numbers</b> |
|--------------|--|----------------|
| 1            | Project Manager                              | 3              |
| 2            | Administrative Manager                       | 3              |
| 3            | Civil Engineer                               | 8              |
| 4            | Mechanic Engineer                            | 5              |
| 5            | Design Engineer                              | 6              |
| 6            | Supervisor                                   | 15             |
| 7            | Surveyor                                     | 40             |
| 8            | Daily Workers/Stone and Wood Craftsman, etc. | 150            |
| <b>Total</b> |  | <b>230</b>     |

Source : Ministry of Public Works, 2011.

Contractor manpower is prioritized to work during construction stage. Working system for manpower for the construction works will be established according to the current stated ordinance and project work plan so that security, safety, health and social security of manpower will be guaranteed and efficiency of work implementation will be achieved. For preparation of Employment Agreement, the Employer will coordinate with Manpower Council of OKU Timur and OKI Districts and the recruitment process will also be coordinated with the Head of Village/Community in and around the project area. In addition, community safety guarantee and development activity plan will be considered as reference through direct coordinating efforts with community or other related parties such as local government institution and police.

Regional Manpower (AKAD) from other Cities/Districts or other Provinces may be recruited by using some special arrangements. Coordination with Manpower Council of South Sumatra Province is always required prior to such manpower recruitment. The manpower with specific experience or skill may be recruited from other Cities/Districts or Provinces as needed.

### **2.2.2.2 Mobilization of Equipments and Materials**

The main heavy equipments to be mobilized are bulldozer, excavator, dump truck, roller and batching plant (Table 2.3). The main materials to be required are cement, sand, gravel, wood, reinforcement bars and so on. Heavy equipments will be mobilized from Palembang City to the project site. Construction materials such as sand, gravel and filling soil material will be brought from the surrounding areas.

Filling soil material will be taken from the borrow area near the construction site. The tentative location of borrow areal is shown in Appendix. Most of the borrow area is owned by the community members at present and will be compensated by the Contractor.

**Table 2.3. Heavy Equipments to be mobilized for the Construction Works**

| No | Type  | Units |
|----|---|-------|
| 1  | Bulldozer, 20 ton grade                         | 25    |
| 2  | Backhoe (Excavator), (0.8 m <sup>3</sup> grade) | 50    |
| 3  | Dump truck, (12 ton grade)                      | 100   |
| 4  | Compaction Roller, (10 ton grade)               | 12    |
| 5  | Batching plant, (20 m <sup>3</sup> /hr grade)   | 5     |

Source: Ministry of Public Works (2011)

#### **2.2.2.3. Construction Works**

Implementation of the project will include several activities such as facilities and infrastructure construction, mobilization and operation of equipment, recruitment of manpower and transportation of materials. Additional issues needed to be taken into consideration is the construction works are the physical conditions of the construction site such as type of vegetation and the geography of the area. In addition, social conditions of the surrounding community should be also considered for the smooth implementation of the construction works, mobilization and operation of equipment, recruitment of manpower and transportation of materials. Construction works will be executed in accordance with the specifications of the Contract which was prepared taking into consideration the potential impacts on environmental and social aspects such as working safety, noise, and air and water quality.

Implementation schedule of the construction works of Lempuing Irrigation System for 5,000 ha is shown in Table 2.4. As shown in Table 2.4, the activities will be commenced after for the issuance of Decree Letter of South Sumatra Governor related to environmental feasibility of the project which is estimated to be issued in March 2012. Irrigation System for the remaining area for 8,500 ha will be constructed after the completion of 5,000 ha. The design of irrigation canals and those related structures is made based on the Standard of Water Resources Directorate General as shown in Table

2.5, whereas the length, irrigable area and discharge of each proposed irrigation canal is shown in Table 2.6.

Table 2.4. Schedule of Construction Works for Lempuing Irrigation System for 5,000 ha

| <b>Activities</b>     | <b>2012</b> |     |     |     |     |     |     |     |     |     |     |     | <b>2013</b> |     |   |     |
|-----------------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|-----|---|-----|
|                       | Jan         | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan         | Feb | Mar                                       | Jul |
| 1.Tender Procedure    |             |     |     |     |     |     |     |     |     |     |     |     |             |     |   |     |
| 2. Contract Agreement |             |     |     |     | ●   |     |     |     |     |     |     |     |             |     |   |     |
| 3.Conference by JICA  |             |     |     |     | ●   |     |     |     |     |     |     |     |             |     |   |     |
| 4.Construction Works  |             |     |     |     |     |     |     |     |     |     |     |     |             |     | 15 months                                 |     |
| 5.AMDAL               |             |     |     |     |     |     |     |     |     |     |     |     |             |     | Authorization is no later than March 2012 |     |

Source: Ministry of Public Works (2011).

Irrigable area has been estimated as 13,500 ha based on the existing land use map which consists of existing paddy field (10,242 ha) and potential paddy field (3,258 ha). Irrigation canal system at Lempuing area consists of Secondary Canal (SC), Sub-Secondary Canal (SSC), Tertiary Canal (TC) and Quaternary Canal (QC). The irrigation water for Lempuing area of 13,500 ha will be diverted at structure BB 25 through Belitang SC.

Table 2.5. General Features of Proposed Canals

|  | <b>DESCRIPTION</b> | <b>DESIGN</b>   |
|--|--------------------|---|
| Design Discharge                         |                    |   |
| <i>Secondary and Sub-Secondary Canal</i> |                    | 19.4 – 0.03 m <sup>3</sup> /s                                   |
| <i>Tertiary Canals</i>                   |                    | 0.18 – 0.01 m <sup>3</sup> /s                                   |
| Canal Type                               |                    |   |
| <i>Secondary Canal</i>                   |                    | Trapezoid with concrete lining                                  |
| <i>Sub-secondary Canal</i>               |                    | Trapezoid with concrete lining or Rectangle with concrete flume |
| <i>Tertiary Canals</i>                   |                    | Trapezoid with concrete lining                                  |
| Canal Base Width                         |                    |   |
| <i>Secondary and Sub-Secondary Canal</i> |                    | 0.5 – 7.0 m   |
| <i>Tertiary Canals</i>                   |                    | 0.3 – 0.5 m   |
| Canal Base Width/Water Depth (B/h) Ratio |                    | 3.1 – 5.2   |
| Velocity                                 |                    | 0.5 – 1.7 m/s   |
| Roughness Coefficient                    |                    | 3.1 – 5.2   |
| Freeboard                                |                    |   |
| Lining Portion                           |                    | 0.2 – 0.5 m   |
| Earthen Portion                          |                    | 0.2 – 0.5 m   |
| Side Slope                               |                    | 1.0 – 1.5   |

Source: Ministry of Public Works (2011).

Table 2.6. Irrigable Area, Length and Discharge of Proposed Canal at Lempuing

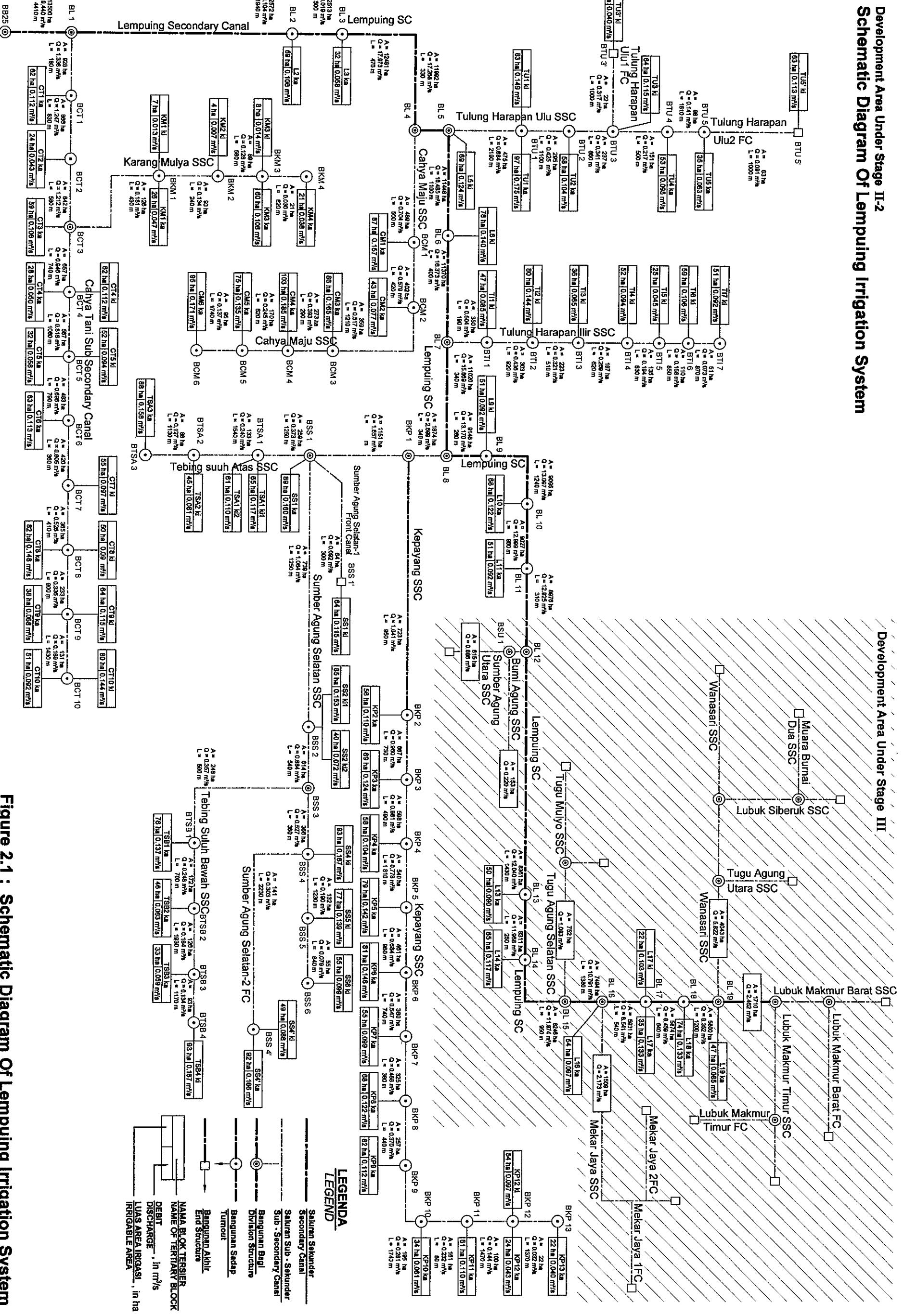
| No   | Irrigation Canal        | Area (ha) | Length (m) | Discharge (m³/sec) |
|--|-------------------------|-----------|------------|--------------------|
| <b>SC (Secondary Canal) Lempuing</b>           |                         |           |            |                    |
| 1  | BP - BL 11 (Stage II-2) | 408       | 12,950     | 19.4 – 12.9        |
| 2  | BL 11 (Stage III)       | 347       | 6,700      | 12.0 – 8.35        |
|  | Sub Total               | 755       | 19,650     |                    |
| <b>SSC (Sub Secondary Canal) at Stage II-2</b> |                         |           |            |                    |
| 1  | Cahya Tani              | 802       | 7,280      | 1.34 – 0.19        |
| 2  | Karang Mulya            | 126       | 1,870      | 0.18 – 0.03        |
| 3  | Cahya Maju              | 489       | 4,890      | 0.70 – 0.14        |
| 4  | Tulung Harapan Ulu      | 475       | 8,260      | 0.68 – 0.09        |
| 5  | Tulung Harapan Ilir     | 350       | 4,790      | 0.50 – 0.07        |
| 6  | Kepayang                | 723       | 11,520     | 2.70 – 0.03        |
| 7  | Sumber Agung Selatan    | 644       | 6,750      | 1.66 – 0.08        |
| 8  | Tebing Suluh Bawah      | 248       | 4,390      | 0.36 – 0.13        |
| 9  | Tebing Suluh Atas       | 259       | 3,920      | 0.37 – 0.13        |
|  | Sub Total               | 4,116     | 53,670     |                    |
| <b>SSC (Sub Secondary Canal) at Stage III</b>  |                         |           |            |                    |
| 1  | Sumber Agung Utara      | 462       | 4,900      | 0.89 – 0.04        |
| 2  | Bumi Agung              | 153       | 2,800      | 0.22 – 0.04        |
| 3  | Tugu Agung Selatan      | 514       | 2,800      | 1.08 – 0.04        |
| 4  | Tugu Mulyo              | 238       | 3,300      | 0.34 – 0.04        |
| 5  | Mekar Jaya              | 1,509     | 13,300     | 2.17 – 0.04        |
| 6  | Wanasari                | 1,545     | 12,600     | 5.82 – 0.04        |
| 7  | Tugu Agung Utara        | 128       | 2,900      | 0.10 – 0.04        |
| 8  | Lubuk Siberuk           | 1,573     | 10,200     | 3.41 – 0.04        |
| 9  | Muara Burnai Dua        | 797       | 5,300      | 1.15 – 0.04        |
| 10   | Lubuk Makmur Barat      | 1,067     | 11,600     | 2.46 – 0.04        |
| 11   | Lubuk Makmur Timur      | 643       | 8,000      | 0.93 – 0.04        |
|  | Sub Total               | 8,629     | 77,700     | -                  |
| <b>Total</b>                                   |                         | 13,500    | 151,020    | -                  |

Source: Ministry of Public Works, 2011.

Proposed irrigation diagram is shown in Figure 2.1. Figure 2.2 shows the cross section of the proposed canal and Figure 2.3 shows the proposed irrigation network. Table 2.7 shows the numbers the canal related structures on each type of canal with its length and number.

**Development Area Under Stage II-2**  
**Schematic Diagram Of Lempuing Irrigation System**

**Development Area Under Stage III**



**Figure 2.1 : Schematic Diagram Of Lempuing Irrigation System**

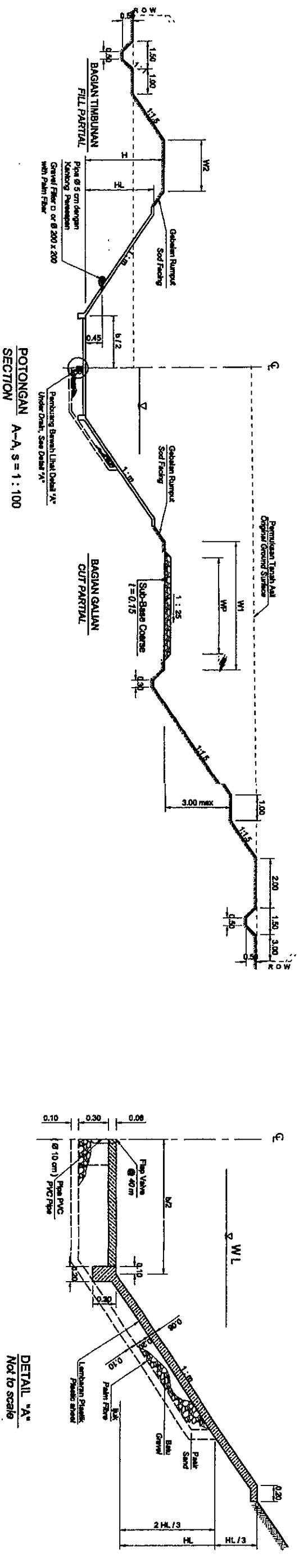
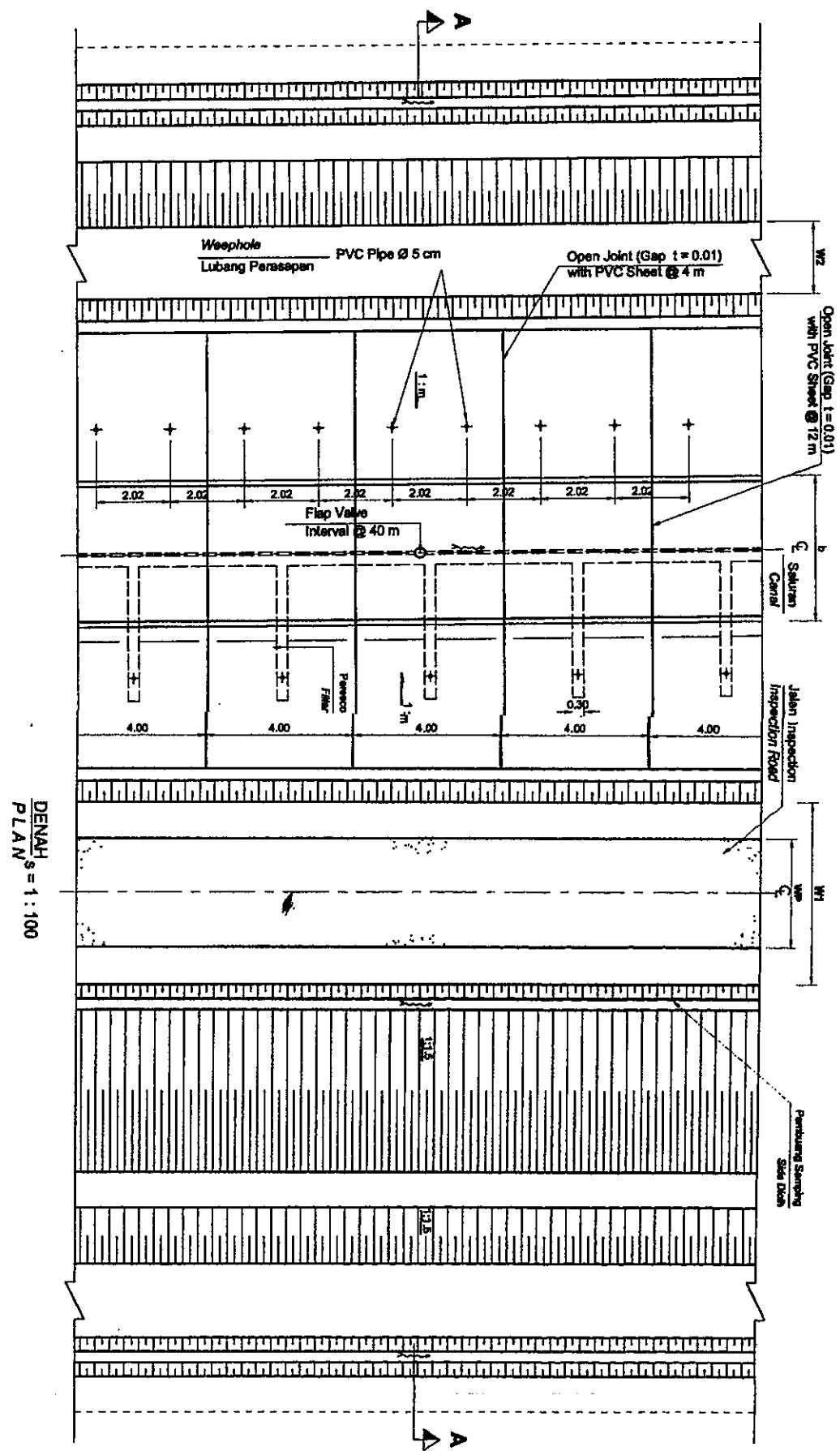
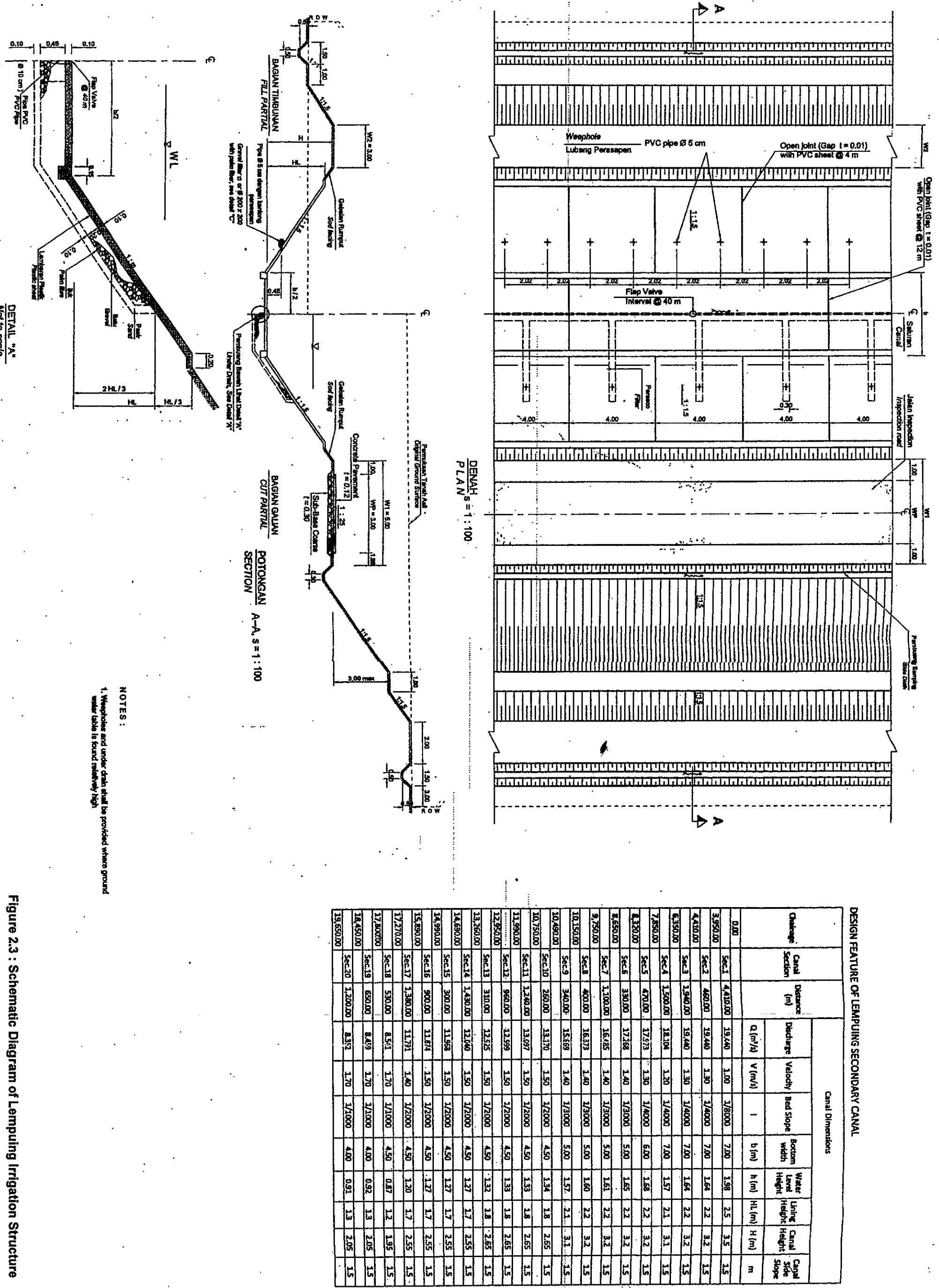


Figure 2.2 : Description of Cross section of Lempuung Secondary Canal

| DATE       | REVIEWED                     | APPROVED                     |
|------------|------------------------------|------------------------------|
| 01/02/2012 | by _____<br>checked by _____ | by _____<br>checked by _____ |

NOTE:  
1. Weepholes and under drain shall be provided where ground water table is found relatively high.



**Figure 2.3 : Schematic Diagram of Lempuing Irrigation Structure**

**Table 2.7. Numbers of Related Structures at the Proposed Canal**

| <b>Description</b>                         | <b>Stage II</b> | <b>Stage III</b> | <b>Total</b> |
|--|-----------------|------------------|--------------|
| <b>Lempuing Secondary Canal</b>            |                 |                  |              |
| - Canal length (km)                        | 12.95           | 6.70             | 19.65        |
| <b>Related Structure (nos)</b>             |                 |                  |              |
| Diversion Structure w/check                | 5               | 4                | 9            |
| Turnout                                    | 6               | 4                | 10           |
| Aqueduct/Siphon                            | 2               | 1                | 3            |
| Culvert (Road and Drainage Crossing)       | 1               | 2                | 3            |
| Spillway/Wasteway                          | 1               | 0                | 1            |
| Bridge                                     | 7               | 15               | 22           |
| Drainage Culvert                           | 8               | 2                | 10           |
| <b>Sub-secondary canal</b>                 |                 |                  |              |
| - Nos of sub secondary canal               | 9               | 10               | 19           |
| - Total Length of sub secondary canal (km) | 53.67           | 77.70            | 131.37       |
| <b>Related Structure (nos)</b>             |                 |                  |              |
| Diversion Structure w/check                | 5               | 8                | 13           |
| Turnout                                    | 47              | 100              | 147          |
| Aqueduct/Siphon                            | 3               | 4                | 7            |
| Culvert (Road and Drainage Crossing)       | 16              | 47               | 63           |
| Spillway/Wasteway                          | 2               | 3                | 6            |
| Bridge                                     | 54              | 65               | 119          |
| Drainage Culvert                           | 26              | 15               | 41           |
| End Structure                              | 12              | 18               | 30           |

Source: Ministry of Public Works, 2011

Inspection road will be constructed for the future operation and maintenance of the project facilities. The description of the proposed inspection roads is shown in Table 2.8.

**Table 2.8. Description of the Proposed Inspection Roads**

| <b>Canal Types</b>            | <b>Stage II</b> | <b>Stage III</b> | <b>Total</b> | <b>Dimension</b>  |
|-------------------------------|-----------------|------------------|--------------|---|
| Secondary Canal (SC) (m)      | 12,950          | 6,700            | 19,650       | Width 5.0 m<br>Effective width 3.0 m<br>Asphalt or Gravel Pavement  |
| Sub Secondary Canal (SSC) (m) | 53,670          | 77,700           | 131,370      | Width 3.0 ~ 5.0 m<br>Effective width 2.0 ~ 3.0 m<br>Gravel Pavement |

Source: Ministry of Public Works, 2011

### **2.2.3. Operational Stage**

The activities at operation stage will be as follows:

#### **2.2.3.1. Disengagement of Construction Manpower**

All construction manpower in general are declared finishing their jobs after the end of construction stage. Work at this construction stage was depended on contractor. The regulation of decreasing manpower numbers should be previously noticed to the workers at the time of recruitment at initial construction stage in order to prevent unnecessary social unrest/conflict related to disengagement. The regulation of decreasing manpower numbers shall be prepared based on the current stated regulation from Manpower Department. The initiator may offer the follow up works at post-construction stage to the workers whose working attitude and performance have been generally good during the construction stage.

#### **2.2.3.2. Operation and Maintenance of Canal/Irrigation Facilities**

Maintenance of canal and irrigation facilities is required for the optimum utilization of irrigation water. The canal will be maintained with the water user's association (P3A) to be established after the functioning of irrigation system. Canal maintenance works from planting to harvesting, in general, consists of canal strength stabilization, canal leakage prevention, and weed prevention. The impacts caused by improper canal maintenance may results in delay of water distribution, insufficient amount of irrigation water or unfair water distribution.

The existence of clean canal and accessible inspection road by motor vehicles had potential to be visited or crossed by people and motor vehicles. This in turn will create the potential for increase of economic activity in the surrounding site. Moreover, irrigation canal might be used as garbage disposal by the surrounding community members, especially household wastes that will be thrown into canal if not properly managed. Canal maintenance activities should be conducted continuously either through periodic cleaning, installation of permanent notice board for not discharging garbage into canal, and appeal for not using canal as facilities for bathing, washing, and latrine.

### **2.2.3.3. Optimal Utilization of Irrigation Water**

After irrigation network development and irrigated land preparation stages had finished, the next stage is utilization of available irrigation water as optimum as possible for crop cultivation of paddy field rice. Water user farmer organization (P3A) which is developed after the operation of irrigation network has important role in irrigation water utilization which is planned to irrigate all villages at Semendawai Timur, Lempuing and Lempuing Jaya Sub-districts (Land Use Map). Although the agreement in term of water utilization pattern to provide optimum level for all paddy field requirement is already exist, there is possibility of deviate water utilization so that farmers which have paddy field in downstream side will receive under optimum amount of irrigation water. In addition for rice requirement, irrigation water is also utilized for fish farming requirement, husbandry and even for household requirement especially during dry season where the digging wells are dry.

The communities livelihoods become vary due to availability of sufficient water resources. Rice planting pattern can be done three times a year. Fish cultivation can be done at paddy field area by using rice-fish system. Furthermore, activity at operational stage will provide job opportunity for cow/buffalo owner, hand tractor owner, huller owner and farm labors. Therefore, it can be concluded that the community income will increase two to three times compared to the condition before technical irrigation is exist at the study area because they can harvest two to three times per year from rice cultivation due to availability of sufficient water resources. Thus, the income of cow/buffalo owner, hand tractor and huller owners will increase according to planting pattern change from one time into two or three times per year. The existence of technical irrigation means that water resources is available in relatively abundant quantity.

### **2.2.4. Post Operational Stage**

The proposed activities at post operational stage are as follows :

#### **2.2.4.1. Canal and Irrigation Facilities Management**

All available land will be managed so that they can function according to the requirement after the canal is not in use. This can be done through rehabilitation by using re-vegetation or greenbelt method in accordance to RDTR (Detail Space Allotment Plan). Good condition equipments will be moved into other sites.

#### **2.2.4.2. Manpower Management**

Management or utilization of manpower is related to ordering of canal and irrigation facilities. Most of manpower that will be employed is unskilled manpower as operator of equipments and vehicles for demolition and materials mobilization from demolition operation as well as building workers for managing of canal and irrigation facilities.

### **2.3. Alternatives in Environmental Impact Assessment Study**

Environmental Impact Assessment Study is a feasibility study of environmental aspect so that activity plan components should have some related alternatives such as location, process, layout of structures and supporting facilities. Alternatives in Environmental Impact Assessment Study had been planned previously so that initiator can use these alternatives during the on-going of Environmental Impact Assessment Study. The proposed alternatives in Environmental Impact Assessment Study are as follows :

#### **2.3.1. Land and Building Acquisition**

Land and building acquisition is conducted according to Governor Regulation No. 25/2009 related to Tariff Guideline for Compensation of Land and Growing Plants Acquisition as well Buildings available in this land. The alternative that will be studied is land acquisition system, whether through land purchase or land compensation at other location having equivalence value to the land and buildings condition that are liberated previously.

#### **2.3.2. Equipment and Materials Mobilization**

The equipments that will be mobilized are heavy equipments for construction and structure or building materials. The alternative of studied mobilization time is at day time.

#### **2.3.3. Irrigation Canal Maintenance**

This activity is the responsibility of contractor or operator up to specific time period. Subsequently, canal maintenance is become the responsibility of government/Ministry of Public Works through APBD (Local Government Revenue Budget). Alternative to be studied is either the maintenance activity is conducted in collaboration with privates' party or community members.

#### **2.4. The Existing Activities in Surrounding Location**

Location of activities plan is at three Sub-districts consisting of Semendawai Timur Subdistrict in OKU Timur District and Lempuing Subdistrict as well as Lempuing Jaya Subdistrict in OKI District. Activities at the surrounding of project in general consist of agricultural activities conducted by the community members. General commodities consist of paddy field rice (rainfed), rubber and other plantation crops.

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**CHAPTER III**  
**ENVIRONMENTAL CONDITION**

# **CHAPTER III**

## **Environmental Condition**

The current environmental condition as a baseline study should be described in order to know the future change due to development activity plan of Lempuing Irrigation Area Network at Semendawai Timur Sub-district of OKU Timur District as well as Lempuing and Lempuing Jaya Sub-districts of OKI District covering area of 13,500 hectares. Environmental condition to be studied consists of physicochemical, biological, socioeconomic, sociocultural and community health aspects. Not all environmental components are studied in detail, but detail study will be given to environmental components which will experience significant change and have impact on other environmental components. By using data sampling method, then initial environmental condition of project site and its surrounding area can be described as follow.

### **3.1. Physic-Chemical Environment**

#### **3.1.1. Climate**

The study area is characterized by uniform high temperature for the whole year, high relative humidity as well as wet and dry monsoon cycles which are similar to condition of other tropical area within South Sumatra. High rainfall is observed from November to March and the lowest rainfall is observed from June to September. The climatic data of study area is given in Table 3.1.

**Table 3.1. Climatic Data of Study Area.**

| Items                 | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Air temperature (°C)  | 26.7 | 26.2 | 26.9 | 27   | 27.9 | 27.8 | 27   | 27.5 | 26.4 | 27.2 | 26.1 | 26.5 |
| Rainfall (mm)         | 303  | 268  | 291  | 233  | 133  | 87   | 81   | 88   | 75   | 135  | 259  | 285  |
| Rain day (day)        | 11   | 10   | 11   | 9    | 5    | 4    | 4    | 5    | 4    | 5    | 9    | 11   |
| Relative humidity (%) | 84   | 86   | 87   | 86   | 82   | 77   | 79   | 75   | 76   | 80   | 83   | 87   |
| Evaporation (mm)      | 153  | 136  | 165  | 169  | 155  | 130  | 132  | 163  | 162  | 163  | 150  | 160  |
| Sunshine (%)          | 51.2 | 44.6 | 55.8 | 59.7 | 67.4 | 87   | 78.8 | 73.1 | 61.5 | 68.9 | 49.3 | 35.4 |
| Wind speed (knot)     | 5    | 4    | 4    | 5    | 5    | 6    | 5    | 5    | 5    | 5    | 5    | 5    |

Source: Ministry of Public Works (2011).

Remarks : Air temperature (1971-2009), Relative humidity, Evaporation, Sunshine and Wind Speed (994-2009) is obtained from Stasiun Meteorologi Pertanian Khusus Belitang. Rainfall and Rain Day (1992-2010) is obtained from Stasiun Meteorologi Pertanian Khusus Belitang and Cabang Dinas Pertanian Tanaman Pangan, Lempuing Jaya Sub-district, Ogan Komering Ilir District.

### 3.1.2. Air Quality and Noise

Data analysis of air quality and noise is based on Government Regulation of Indonesia Republic No. 41/1999 related to Air Pollution Control (National Ambient Air Quality Standard), Environmental Ministry Decree No. Kep-48/MENKLH/1996 related to noise level standard and Regulation of South Sumatra Governor No. 17/2005 related to ambient air quality standard for South Sumatra Province. Measurement results and analysis of air quality and noise at activity location is presented in Table 3.2.

Table 3.2. Measurement Results and Analysis of Air Quality and Noise.

| No | Parameter         | Units              | Measurement Results |        |        |        | BML* |
|----|-------------------|--------------------|---------------------|--------|--------|--------|------|
|    |                   |                    | U1                  | U2     | U3     | U4     |      |
| 1  | Temperature       | °C                 | 33.9                | 29.2   | 30     | 28.2   | -    |
| 2  | Relative Humidity | % RH               | 57.3                | 81.2   | 37.2   | 77.5   | -    |
| 3  | SOx               | µg/Nm <sup>3</sup> | 98.18               | 107.16 | 99.9   | 104.36 | 900  |
| 4  | NOx               | µg/Nm <sup>3</sup> | 48.35               | 50.6   | 49.42  | 52.7   | 400  |
| 4  | H2S               | ppm                | 0.0025              | 0.0026 | 0.0028 | 0.0031 | 0.03 |
| 5  | Noise             | dBA                | 49.3                | 55.2   | 49.4   | 67.6   | 70** |

Source: Ministry of Public Works (2011).

Remarks:

- \*) Environmental Ministry Regulation No.41/1999 related to Air Pollution Control.
- \*\*) Environmental Ministry Decree No.48/1996 related to Noise Level Quality Standard.
- U1 03°56'03,2" - 104°49'45,3" Project Site Plan (Tugu Agung Village)
- U2 03°54'04,4" - 104°53'06,2" Community Settlement (Tebing Suluh Bawah Village)
- U3 03°50'4,0" – 104°54'10,2" Community Settlement (Karang Melati Village)
- U4 03°47'30,1" – 104°55'30,0" Project Site Plan (Lubuk Makmur Village)

#### 3.1.2.1. Air Temperature

Air temperature is very important in measurement because generally gases content in air is inversely proportional to air temperature. Gas pollutant concentration in air is usually high at low air temperature (floating close to earth surface) and gas pollutant concentration in air is low at high air temperature (gas move up into atmosphere). Measurement results at four locations such as presented in the above table showed that air temperature was in the range of 28.2 to 33.9 °C.

### **3.1.2.2. Sulphur Oxide ( $\text{SO}_x$ )**

Measurement results at study location showed that  $\text{SO}_x$  content was in the range of 98.18  $\mu\text{g}/\text{Nm}^3$  to 107.16  $\mu\text{g}/\text{Nm}^3$  which was lower than the stated quality standard with magnitude of 900  $\mu\text{g}/\text{Nm}^3$ .

### **3.1.2.3. Nitrogen Oxide ( $\text{NO}_x$ )**

Nitrogen oxide ( $\text{NO}_x$ ) is a group of gas found in atmosphere that consisted of nitric oxide (NO) and nitrogen dioxides ( $\text{NO}_2$ ). These two gases are mostly found as air pollutant, although some other forms of nitrogen oxide are also available. Nitric oxide is colorless and odorless gas, whereas nitrogen dioxides has reddish brown color and strong odor. The numbers of  $\text{NO}_2$  in air at equilibrium condition is affected by exhaust gas temperature of transportation vehicles.  $\text{NO}_2$  at high temperature will be redissociated into  $\text{N}_2$  and  $\text{O}_2$ . Nitrogen oxide in the form of nitrogen monoxide gas (NO) or nitrogen dioxides gas ( $\text{NO}_2$ ) has a role in smog and acid rain formation.

The  $\text{NO}_x$  in atmosphere at 3.5 ppm will cause necrosis or leave damage (Stoker and Seagar, 1972).  $\text{NO}_2$  at 5 ppm concentration inhaled for 10 minutes by human will cause breathing difficulty. The measurement results showed that  $\text{NO}_x$  content was in the range of 48.35  $\mu\text{g}/\text{Nm}^3$  to 52.6  $\mu\text{g}/\text{Nm}^3$  which was lower than the stated environmental quality standard with magnitude of 400  $\mu\text{g}/\text{Nm}^3$ .

### **3.1.2.4. Hydrogen Sulphide ( $\text{H}_2\text{S}$ )**

Natural emission source of hydrogen sulphide gas ( $\text{H}_2\text{S}$ ) is organic matter decomposition by microorganisms and sulphate compound reduction. Results of measurement and laboratory analysis at 4 points of sampling such as presented in the above table showed that hydrogen sulphide gas content in ambient air was in the range of 0.0025 to 0.0031 ppm which was lower than the stated quality standard. It means that environmental initial condition at activity plan location is free from hydrogen sulphide gas pollutant.

### **3.1.2.5. Noise Level**

Noise in working health is defined as sound that can decrease the hearing capability. It can also be defined as unwanted sound such as the one that prevent sound hearing, music and others or the one that cause painful sense or hamper the life style.

The general cause of noise is from motor vehicles activities ; however, noise level from activities has no significant effect on community settlement in the nearby of activity location because it might be damped by the company.

Noise intensity measurement was conducted in the same time with air quality measurement. Results of noise measurement either at community settlement location or at activity plan location showed that noise level was in the range of 49.3 to 67.6 dBA which was lower than the stated quality standard with magnitude of 70 dBA (for industrial areas based on Environmental Ministry Decree No.48/1996 related to Noise Level Quality Standard).

Observation results of important parameters of ambient air quality and noise level at some points in the surrounding of activity location had values lower than environmental quality standard.

### **3.1.3. Space, Land and Soil**

#### **3.1.3.1. Land Use**

Land for development location of Lempuing Irrigation Area Network at Lempuing and Lempuing Jaya Sub-districts in OKI District is mostly used by community members for cultivation of rice crops and some second crops as well as some plantation crops such as rubber, fruits, vegetables and mixed farmyard area. This land in general is privately owned and has certificate. Soil type is generally classified as Ultisol (Podsolic) and Alluvial.

Survey results by Ministry of Public Works (2011) showed that land use at study area was categorized into four classes that consisted of paddy field, rubber crop and high land, underbrush and community settlement. Underbrush was extensively distributed along the berm of Komering River and its branches. Alluvial lowland distributed at the east side was mostly used for rainfed rice cultivation, whereas the west side having rather high elevation and undulating surface was used by the community for rubber plant cultivation and other plantation crops (oil palm or cacao). The settlement area consists of settlement,

yard, annual plants, public area, road and ponds. Land use condition at Lempuing area was shown in Table 3.3. Detail description of this land use was presented in land use map (Appendix 4).

**Table 3.3. Land Use Condition at Lempuing Area**

| Land Use Pattern         | Lempuing<br>(ha) | Lempuing Jaya<br>(ha) | Semendawai Timur<br>(ha) | Total Area<br>(ha) | (%) | (%) | (%) | (%) |
|--------------------------|------------------|-----------------------|--------------------------|--------------------|-----|-----|-----|-----|
| Total Area               | 13,023           | 4,394                 | 10,425                   | 27,842             |     |     |     |     |
| Paddy Field Land         | 8,377            | 64                    | 2,756                    | 13,947             | 64  | 63  | 27  | 50  |
| Rubber Land and Dry Land | 2,737            | 21                    | 812                      | 10,669             | 21  | 18  | 68  | 38  |
| Underbrush               | 230              | 2                     | 138                      | 368                | 2   | 3   | 0   | 2   |
| Settlement               | 1,679            | 13                    | 688                      | 2,858              | 13  | 16  | 5   | 10  |

Source : Ministry of Public Works (2011).

### **3.1.3.2. Topography and Soil Type**

Water resources that will be used for irrigation development originate from Komering River that is branched at Perjaya Headworks. Komering River which originate from Selabung and Saka Rivers had catchment area of 4,260 km<sup>2</sup>. Lempuing Area located at downstream of Komering Watershed was surrounded by Komering River branches that consisted of Belitang, Macak and Burnai Rivers.

Lempuing Area is geographically consisted of river flood plain and alluvial plain. Alluvial plain is developed from Komering River and its branches. The west side is topographically had relatively undulating plain and gradually become low land into the east and north directions. The proposed elevation of Lempuing area is in the range 17 m to 45 m from mean sea level. River flood plain having soil type of ortic podsolic and alluvial which is extended at west side (Soil Type Map) can be described as follows :

#### **a. Ultisol (Podsolic)**

Ultisol (Podsolic) with Yellow Red-Yellowish Brown color is equivalence to Acrisol (FAO/Unesco) or Ultisol (USDA). This soil is characterized by : (1) B Horizon-argilic having base saturation less than 50% (NH<sub>4</sub>OAc) at least in several parts of B horizon within cross section of 125 cm from soil surface, and (2) without albic horizon (pale color elluvial horizon) that is directly bordered on argilic horizon or fragipan (loose rock). Argilic

horizon (argilic = white clay) is illuvial horizon (accumulation) having layer of flatty silicate clay that is significantly different than elluviation horizon (leached) located above this horizon up to more than 20%.

According to Dusal and Soepraptohardjo (1957), Red Yellow Podzolic soil is physically characterized by : (1) Heavily leached, (2) Upper layer has yellowish light grey color and red or yellow color at lower layer, (3) Occurrence of clay accumulation which results in relatively heavy texture, (4) Crumb structure, low permeability and low aggregate stability; (5) Elluviation horizon is not always clear and having parent material with yellow, red or grey stain ; (6) Parent materials are silica deposit, napal, sand stone and clay stone; (7) Available at elevation of 50 to 250 m from mean sea level at wet tropical climate having rainfall of 2,500 to 3,500 mm/year; this soil is biologically and chemically characterized by low level of organic matter, base saturation and pH (4.2 – 4.8).

Soil at the study area (Lempuing Irrigation) generally has relatively advance development that is characterized by deep cross section, increasing of clay fraction along with soil depth, acid soil reaction and low base saturation. This soil generally has potential of Al toxicity and low organic matter content. It also has low nutrients content, especially P and exchangeable cations such as Ca, Mg, Na, and K, high Al content, low cation exchange capacity and prone to erosion.

### **b. Alluvial**

Alluvial or Fluvisols (FAO-Unesco, 1974) or Inceptisol (USDA, 1990) is found at Af land unit (Hydromorph Alluvial) and Af (Greyish Brown Alluvial). This soil type is developed from young alluvium material (recent) with three main characteristics consisting of : (1) Having layered structure or heterogenous C organic content, (2) without diagnostic horizon (except if it is filled by at least 50 cm of new material), and (3) Histic or Sulphuric horizon. The A oxic horizon is under developed horizon having very bright/pale color, low/thin organic matter and becoming hard and compact if dry. H histic horizon is organic matter horizon or sulphuric horizon (horizon that rich in pyrite ( $FeS_2$ )) and having sand fraction content of less than 60% at 25 to 100 cm depth from mineral

soil surface. This soil naturally is fertile soil, but it has pH in the range of 3 to 4 (very acid) due to phryrite content.

### 3.1.3.3. Physic Chemical Properties of Soil

Results of field observation and laboratory soil analysis presented in Table 3.4 showed that soil at activity location naturally had low fertility level shown by several indications consisting of very acid to acid pH, nutrients availability such as very low to medium content of macro nutrients (N,P,K), low content of micro elements, low level of base saturation, high level of Al saturation, and medium level of Cation Exchange Capacity (CEC). Inputs important for food crops (rice-second crops) are organic matter, lime and macro nutrients. Lime can be given in the form of keiserite or dolomite to increase soil pH level. Other measures that can be done to provide optimum condition of physical soil fertility is drainage canal development as found nowadays. Organic matter content was varying from low to high. High organic matter content was found at land that had already received additional organic matter from crops wastes which were available in abundant quantity on land surface.

Table 3.4. Analysis Results of Physical and Chemical Properties of Soil at Surrounding of Activity Location.

| Location Code | pH (1:1)<br>H <sub>2</sub> O | pH (1:1)<br>KCl | C-Organic<br>(%) | N-Total<br>(%) | P <sub>2</sub> O <sub>5</sub><br>(μg g <sup>-1</sup> ) |
|---------------|------------------------------|-----------------|------------------|----------------|--|
| T1            | 4.63 m                       | 3.48 sm         | 2.13 s           | 0.12 r         | 1.70 sr  |
| T2            | 4.4 sm                       | 3.23 sm         | 1.17 r           | 0.11 r         | 4.20 sr  |
| T3            | 4.2 sm                       | 3.04 sm         | 2.86 s           | 0.21 s         | 4.14 sr  |
| T4            | 4.73 m                       | 3.58 sm         | 2.43 s           | 0.18 r         | 1.80 sr  |
| T5            | 4.56 m                       | 3.46 sm         | 1.18 r           | 0.10 r         | 3.30 sr  |
| T6            | 4.54 m                       | 3.44 sm         | 3.46 t           | 0.26 s         | 4.95 sr  |
| T7            | 4.54 m                       | 3.44 sm         | 3.46 t           | 0.26 s         | 4.95 sr  |

| Location Code | (me/100 g) |        |        |         |         |         | Texture (%) |       |       |       |
|---------------|------------|--------|--------|---------|---------|---------|-------------|-------|-------|-------|
|               | K          | Na     | Ca     | Mg      | CEC     | Al-dd   | H-dd        | Sand  | Loam  | Clay  |
| T1            | 0,14 r     | 0,45 s | 0,34 r | 0,15 sr | 17,18 s | 2,11 t  | 0,76        | 22,13 | 51,89 | 25,98 |
| T2            | 0,16 r     | 0,41 s | 0,31 r | 0,07 sr | 16,05 r | 2,48 t  | 0,82        | 21,30 | 44,49 | 34,21 |
| T3            | 0,14 r     | 0,23 r | 0,31 r | 0,13 sr | 16,37 r | 2,81 t  | 0,77        | 33,36 | 47,94 | 18,70 |
| T4            | 0,19 r     | 0,55 s | 0,38 r | 0,17 sr | 18,88 s | 2,20 t  | 0,82        | 19,13 | 52,89 | 27,98 |
| T5            | 0,15 r     | 0,44 s | 0,30 r | 0,08 sr | 19,05 s | 3,04 st | 0,72        | 23,40 | 42,39 | 34,21 |

|    |        |        |        |         |         |        |      |       |       |       |
|----|--------|--------|--------|---------|---------|--------|------|-------|-------|-------|
| T6 | 0,18 r | 0,32 r | 0,36 r | 0,12 sr | 17,41 s | 2,88 t | 0,76 | 34,16 | 47,92 | 17,92 |
| T7 | 0,19 r | 0,33 r | 0,33 r | 0,12 sr | 17,40 s | 2,88 t | 0,76 | 20,30 | 43,49 | 36,21 |

| Location Code | Permeability (cm/hr) | Bobot Isi (g/cm <sup>3</sup> ) | Porosity (%) | Water Content (%) | Structure      | Color       |
|---------------|----------------------|--------------------------------|--------------|-------------------|----------------|-------------|
| T1            | 12,212 c             | 0,97 s                         | 27,82        | 41                | Agak Gumpal    | 7, 5 YR 4/4 |
| T2            | 10,7111 c            | 0,97 s                         | 46,77        | 43                | Granularhalusl | 7, 5 YR 4/4 |
| T3            | 4,461al              | 1,11 s                         | 46,67        | 33                | Agak Gumpal    | 7, 5 YR 4/3 |
| T4            | 6,712 al             | 2,14 s                         | 31,14        | 41                | Granular       | 7, 5 YR 4/3 |
| T5            | 4,771 al             | 1,12 s                         | 39,14        | 38                | Granular       | 7, 5 YR 4/4 |
| T6            | 7,111 al             | 1,09 s                         | 32,14        | 40                | Granular halus | 7, 5 YR 4/4 |
| T7            | 6,781 al             | 1,34 s                         | 29,14        | 37                | Agak Gumpal    | 7, 5 YR 4/3 |

Source: Primary Data, Data Analysis Results from Chemical, Biological and Soil Fertility Laboratory, Agricultural Faculty, Sriwijaya University, 2011

Remarks: Assessment Criteria for Soil Chemical Properties (Soil Research Center and Agroclimate, 1983)

SR: Very low; R: Low; S: Medium; T: High; ST: Very high; S M: Very acid. C: Fast ; al: Rather slow; s: medium.

T1 (S : 03°47'12,4"; E : 104°52'21,5")

T2 (S : 03°49'43,0"; E : 104°54'1,8")

T3 (S : 03°51'48,6"; E : 104°53'33,6")

T4 (S : 03°54' 4,3"; E : 104°53' 0,7")

T5 (S : 03°54'39,9"; E : 104°55'58,2")

T6 (S : 03°47'21,0"; E : 104°55'58,8")

T7 (S : 03°55'49,9"; E : 104°49'46,6")

High organic matter content is very useful to support plant growth because organic matter can absorb water and nutrients needed by plants. The decomposed organic matter also has a role as nutrients source and mulch in soil surface. Total nitrogen content was medium which means this nutrients was sufficient for food crop (rice) and soil needs little amount of N fertilizer addition. Cation exchange capacity was medium due to relatively high organic matter content.

Soil at study location along the plan of Lempuing irrigation development area was physically can be classified as relatively good, soil permeability was rather slow to fast, medium bulk density, medium porosity, medium water content, soil structure was crumb to clump, soil color was yellowish brown to grayish and soil texture of clayey loam.

### 3.1.3.4. Soil Erosion Potential

Estimation of erosion potential magnitude is based on several main factors that consisted of climate (erosivity), soil internal factor such as soil physical properties (erodibility), topography, and vegetation and management effort level. Erosion prediction

model used to estimate average erosion in the long term is USLE model (*The Universal Soil Loss Equation*). Erosion estimation formula can be written as  $A = R \cdot K \cdot L \cdot S \cdot CP$  having unit of ton/ha/year.

Rainfall erosivity index is calculated based on formula of Lenvain (Lenvain, 1975 in Djaenudin and Soekardi, 1989). Rainfall data used in calculation is obtained from field condition. Calculation results showed that rainfall erosivity value was about 1,318.99 mm/yr by using assumption that rainfall is uniformly distributed in the whole observation area.

Soil erodibility factor (K) is determined on Weischmeir dan Schmitd (USDA, Agriculture Handbook No.537, 1978). Slope length (L) and slope degree (S) are calculated according to formula of Weischmeir and Schmidt (1978).

The soil conservation slope degree (S) and management effort (CP) have highly significant effect on soil erosion magnitude. Magnitude of soil loss due to erosion basically can be decreased by using good land management and soil conservation measures.

Soil sensitivity or soil erodibility is affected by percentage of loam and very fine sand, organic matter percentage, soil structure and soil permeability. Soil having high sensitivity will be more easily eroded or has higher erosion potential. Vegetation condition at the study area in term of land coverage was relatively good to detain rainfall splash and to minimize surface flow velocity. Erosion potential before activity can be determined by field observation.

Table. 3.5. Erosion potential at study area

| <b>Locations</b>  | <b>R</b> | <b>K</b> | <b>L</b> | <b>S</b> | <b>CP</b> | <b>Erosion potential<br/>ton/ha/year</b> |
|---|----------|----------|----------|----------|-----------|--|
| T-1   | 1,318.99 | 0.12     | 0.75     | 0.78     | 0.09      | 8.333                                    |
| T-2   | 1,318.99 | 0.11     | 0.84     | 0.84     | 0.10      | 10.238                                   |
| T-3   | 1,318.99 | 0.09     | 0.78     | 0.77     | 0.09      | 6.417                                    |
| T-4   | 1,318.99 | 0.12     | 0.81     | 0.85     | 0.08      | 8.718                                    |
| T-5   | 1,318.99 | 0.13     | 0.87     | 0.82     | 0.07      | 8.563                                    |
| T-6   | 1,318.99 | 0.14     | 0.89     | 0.83     | 0.11      | 15.005                                   |
| T-7   | 1,318.99 | 0.12     | 0.88     | 0.84     | 0.09      | 10.530                                   |
| Prediction of Average Erosion Potential Before Activity |          |          |          |          |           | 9.685                                    |
|   | 1,318.99 | 0.13     | 0.88     | 0.84     | 0.11      | 13.941                                   |
| Prediction of Erosion Potential After Activity          |          |          |          |          |           | 13.941                                   |
| Erosion Potential Difference                            |          |          |          |          |           | 3.256                                    |

Remarks : R = Erosivity value; L = Slope length factor value; CP = Management measure value ; K = Erodibility value; S = Value of soil conservation slope degree factor.

Erosion potential level before activity implementation (existing) was considered as low with magnitude of  $\pm$  9.685 ton/ha/year based on field observation and erosion estimation result (by using USLE method), whereas erosion potential prediction which occurred after activity implementation (especially during construction stage) can achieve 13.941 ton/ha/year resulting in erosion potential difference of 3.256 ton/ha/year. This erosion potential magnitude was considered low compared to the stated quality standard of erosion tolerance with magnitude of 15 ton/ha/year. This erosion potential should be anticipated through re-vegetation measure and development of mechanical structures such as ridge or ridge terrace especially at area having slope degree more than 8%.

### **3.1.4. Well Water and Surface Water Quality**

Natural water is generally not pure. For instance, rainfall water on mountainous area or remote forest having clean air and free from pollution contains dissolved materials such as CO<sub>2</sub>, O<sub>2</sub> and N<sub>2</sub> as well as suspended materials such as dust and other particles from atmosphere.

The polluted water has varied characteristics depending on water type and pollutants or components which cause pollution. For example, polluted drinking water may have change in taste although odor change is very difficult to be detected. Different indication of water pollution is due to different sources and types of pollutant.

Sampling of well water and river water located at the surrounding of Lempuing Irrigation Area Plan and Development was conducted to study water quality. River water sampling and well water sampling of community members are estimated will be affected by activity plan. The choice of water sampling locations was done by considering the river upstream and downstream sides as well as river flow either before or after crossing Lempuing Irrigation Area Plan and Development so that this water can represent the environmental condition of Lempuing Irrigation Area Plan and Development and its surrounding area. River water and well water samples will be analyzed in laboratory and compared to water quality standard value based on South Sumatra Governor Regulation No. 16/2005 related to Water Allocation and River Water Quality Standard as well as Health Minister Regulation No. 416/Men.Kes/Per/IX/1990 related to Clean Water.

Results of field observation and information from local community showed that water body (river) found at activity plan location in general is used by community members for irrigation purpose, Bathing-Washing-Latrine (MCK), transportation lane and some small part for fish farming. Analysis of water quality data was based on South Sumatra Governor Regulation No.16/2005 related to water allocation and river water quality standard. Results of measurement and laboratory analysis for water quality at activity location was given in Table 3.6.

Table 3.6. Analysis Results of River Water and Well Water at Surrounding Location of Activity Plan.

| No                                   | Parameters | Units   | River Water |        |        |        |           | Well Water |        | Quality Standard<br>*) (**) |
|--------------------------------------|------------|---------|-------------|--------|--------|--------|-----------|------------|--------|-----------------------------|
|                                      |            |         | A1          | A2     | A3     | A4     | A5        | A6         | A7     |                             |
| <b>I</b> <b>Physic</b>               |            |         |             |        |        |        |           |            |        |                             |
| 1. Temperature                       | °C         | 21,9    | 22          | 21,8   | 21,9   | 21,9   | 22        | 22,1       | Dev ±3 | Dev ±3                      |
| 2. Dissolved Solids                  | mg/l       | 16      | 16          | 33     | 30     | 45     | 326       | 57         | 1500   | 1500                        |
| 3. Suspended Solids                  | mg/l       | 9,2     | 11,2        | 10,8   | 12,6   | 17,9   |           |            | 50     |                             |
| 4. Odor                              | -          |         |             |        |        |        | Odorless  | Odorless   |        | -                           |
| 5. Taste                             | -          |         |             |        |        |        | Tasteless | Tasteless  |        | -                           |
| 6. Turbidity                         | NTU Scale  |         |             |        |        |        | 10,53     | 0,12       |        | 25                          |
| 7. Color                             | TCU Scale  |         |             |        |        |        | 22        | 7          |        | 50                          |
| <b>II</b> <b>Unorganic Chemistry</b> |            |         |             |        |        |        |           |            |        |                             |
| 1. pH *at Laboratory                 | #          | 6,48    | 6,49        | 6,78   | 7,18   | 6,01   | 7,39      | 5,93       | 6 - 9  | 6,5-9,0                     |
| 2. Dissolved Iron                    | mg/l       | 0,0345  | 0,2471      | 0,1044 | 0,2046 | 0,0387 | 0,1084    | 0,0781     | 0,3    | 1                           |
| 3. Dissolved Mangaan                 | mg/l       | 0,0161  | 0,0204      | 0,0186 | 0,0193 | 0,0243 | 0,0098    | 0,0108     | 0,1    | 0,5                         |
| 4. Zinc                              | mg/l       | 0,0865  | 0,0903      | 0,4071 | 0,4081 | 0,3048 | 0,8124    | 0,2481     | 0,5    | 15                          |
| 5. Cadmium                           | mg/l       | <0,0032 | tt          | tt     | tt     | tt     | tt        | tt         | 0,1    | 0,005                       |
| 6. Mercury                           | mg/l       | tt      | tt          | tt     | tt     | tt     | tt        | tt         | 0,001  | 0,001                       |
| 7. Lead                              | mg/l       | <0,0022 | tt          | tt     | tt     | tt     | tt        | tt         | 0,03   | 0,05                        |
| 8. Sulphate                          | mg/l       | 13,205  | 19,170      | 23,052 | 25,117 | 20,112 | 18,014    | 21,103     | 400    | 400                         |
| 9. Arsen                             | mg/l       | tt      | tt          | tt     | tt     | tt     | tt        | tt         | 0,05   | 0,05                        |
| 10. Selenium                         | mg/l       | tt      | tt          | tt     | tt     | tt     | tt        | tt         | 0,01   |                             |
| 11. Cyanide                          | mg/l       | 0,0012  | 0,0015      | 0,004  | 0,002  | 0,0011 | 0,009     | 0,005      | 0,02   | 0,1                         |
| 12. Fluoride                         | mg/l       | 0,0033  | 0,003       | 0,002  | 0,0012 | 0,0012 | 0,0013    | 0,003      | 0,5    | 1,5                         |
| 13. Chloride                         | mg/l       | 6       | 6           | 3      | 4      | 3      | 7,6       | 2          | 600    | 600                         |

| <b>No</b>                    | <b>Parameters</b> | <b>Units</b> | <b>River Water</b> |           |           |           | <b>Well Water</b> |           | <b>Quality Standard</b> |
|------------------------------|-------------------|--------------|--------------------|-----------|-----------|-----------|-------------------|-----------|-------------------------|
|                              |                   |              | <b>A1</b>          | <b>A2</b> | <b>A3</b> | <b>A4</b> | <b>A5</b>         | <b>A6</b> |                         |
| 14.                          | Free Ammonium     | mg/l         | 0,08               | 0,1       | 0,11      | 0,12      | 0,07              |           | 0,5                     |
| 15.                          | Nitrate           | mg/l         | 0,08               | 0,18      | 0,13      | 0,16      | 0,12              | 0,09      | 0,08                    |
| 16.                          | Nitrite           | mg/l         | 0,0102             | 0,0157    | 0,011     | 0,0257    | 0,0205            | 0,0110    | 0,0124                  |
| 17.                          | BOD               | mg/l         | 1,85               | 1,8       | 1,8       | 1,85      | 1,85              |           | 1                       |
| 18.                          | COD               | mg/l         | 2                  | 2         | 2         | 2         | 2                 |           | 2                       |
| 19.                          | Dissolved Oxygen  | mg/l         | 2,82               | 4,32      | 2,93      | 4,87      | 2,62              |           | 6                       |
| 20.                          | Copper            | mg/l         | tt <0,003          | tt        | tt        | tt        | tt                | 0,0101    | 2                       |
| 21.                          | Cobalt            | mg/l         | tt                 | tt        | tt        | tt        | tt                |           | 0,2                     |
| 22.                          | Sulphide          | mg/l         | 0,00012            | 0,0001    | 0,0001    | 0,0002    | 0,0003            |           | 0,002                   |
| 23.                          | Phosphate         | mg/l         | 0,0031             | 0,007     | 0,008     | 0,003     | 0,006             |           | 0,2                     |
| 24.                          | Hardness          | mg/l         |                    |           |           |           |                   | 176,4     | 161,7                   |
| <b>III Organic Chemistry</b> |                   |              |                    |           |           |           |                   |           |                         |
| 1.                           | Oil and Fat       | µg/l         | 62                 | 82        | 83        | 79        | 64                |           | 1000                    |
| 2.                           | Detergent         | µg/l         | 0,02               | 0,03      | 0,03      | 0,06      | 0,02              |           | 200                     |
| 3.                           | Phenol            | mg/l         | 0,01               | 0,2       | 0,06      | 0,2       | 0,1               |           | 1                       |
| 4.                           | Organic Matter    | mg/l         |                    |           |           |           |                   | 0,474     | 0,537                   |
|                              |                   |              |                    |           |           |           |                   |           | 10                      |

Source: Primary Data, Data Analysis Results from Chemical, Biological and Soil Fertility Laboratory, Agricultural Faculty, Sriwijaya University, 2011

Remarks : \*) South Sumatra Governor Regulation No.16/2005 related to Water Allotment and River Water Quality Standard of Class I; \*\* Health Minister Regulation No. 416/Men.Kes/Per/IX/1990 related to Clean Water

- A1 : Lempuing Hulu River ( $S=03^{\circ}54'54.3'' - E=104^{\circ}56'18.5''$ ) A5 : Air Sindang River ( $S=03^{\circ}53'10.4'' - E=104^{\circ}52'44.7''$ )
- A2 : Lempuing Hilir River ( $S=03^{\circ}46'20.5'' - E=104^{\circ}56'15.2''$ ) A6 : Tugu Mulyo Village ( $S : 03^{\circ}52'04.4'; E : 104^{\circ}53'06.2'$ )
- A3 : Macak Hulu River ( $S=03^{\circ}56'42.7'' - E=104^{\circ}48'31.8''$ ) A7 : Karang Anyar Village ( $S : 03^{\circ}56'09.2'; E : 104^{\circ}50'15.4'$ )
- A4 : Macak Hilir River ( $S=03^{\circ}56'30.'' - E=104^{\circ}52'30.2''$ )

## BALAI BESAR WILAYAH SUNGAI SUMATERA VIII

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUIING AREA (13,500 HA)

### **3.1.4.1. Physical Characteristics**

#### **a. Water Temperature**

Water will receive heat from the object being cooled with it. This heat is subsequently sent back into river or other water resources. This water may have higher temperature than initial water temperature. High temperature ( $>45^{\circ}\text{C}$ ) of surface water (water bodies) will affect chemical reaction rate and life order within water.

High temperature can result in the decrease of oxygen solubility within water body so that the required aeration process to degrade organic matter become impeded. This in turn will create impact that can kill water biotas within water body and the affected vegetations. Results of water temperature measurement in laboratory for 7 locations in the surrounding of activity site showed that water temperature was in the range of  $21.8 - 22^{\circ}\text{C}$  which was still safe for water biota life.

#### **b. Dissolved Solid**

The negative impact from dissolved solid consisting of dissolved organic and inorganic substances was in form of sediment or suspension that cause silting-up at receiving surface water body resulting in growth of certain water plants that can be toxic for other organisms. Solid quantity represent mud content within water. High dissolved solid is generally due to flow during rainfall and subsequently carry the solid particles in land into water body. Measurement results of dissolved solid for 7 locations in the surrounding of activity site was in the range of 16 to 326 mg/l which was lower than the stated quality standard with magnitude of 1,500 mg/l.

#### **c. Suspended Solid**

Solid matter content in water body can be represented by TSS (*Total Suspended Solid*) value or Suspended Solid. Solid matter source is not only originated from human activities, but also from natural erosion process on soil in the surrounding of water body. High suspended solid content can impede the penetration of sunlight into water and decrease the photosynthesis rate of water plants. Oxygen supply from water plants is also decrease. If the sunlight is totally impeded, then plants and other living organisms will be death. The decaying process from death plants will further decrease the DO content. Suspended solid absorbs sunlight that results in increasing of surface water temperature.

The high water temperature will make oxygen difficult to dissolve. Thick sediment will results in shallower water body so that water body will be difficult to be used as water transportation lane. High solid content in water body may represent high content of nutrients, bacteria, pesticides and metals within water. Results of laboratory analysis showed that Total Suspended Solid content at five sampling locations was in the range of 9.2 – 17.9 mg/l which was lower than the stated environmental quality standard with magnitude of 50 mg/l.

### **3.1.4.2. Chemical Characteristics**

#### **a. Acidity Level (pH)**

Water has variation of pH which is depending on material type in water. Normal water has pH in the range of 6 to 8. The relatively acid water is due to natural water containing organic matter from several debris in stagnant water condition. Change of acidity in waste water into alkaline (increasing pH) or initial condition (decreasing pH) had significant effect on fishes and water animals' life in the surrounding. Water having high acid value or high base value will disturb the water biotas and equipments.

Analysis results at 5 points in water body surrounding activity plan location was within the allowable range values according to South Sumatra Governor Regulation No. 16/2005 with magnitude of 6.01-7.18. One of sampling location at Tugu Mulyo Village showed pH value which was lower than the stated clean water quality standard.

#### **b. Heavy and Toxic Metals**

Inorganic components as water pollutant are consisted of dangerous heavy metals such as mix of Iron (Fe), Mangaan (Mn), Zinc (Zn), Cadmium (Cd), Mercury (Hg), Lead (Pb) and Copper (Cu). Oxidized Mangaan and Iron in water have brownish color and insoluble which cause limited water utilization, for instance water cannot be used for household and industrial purposes. These elements are originate from solution of rocks containing mangaan and iron such as phryrite, hematite, mangaan and others. Analysis results from 7 water samplings showed that heavy metals content was lower than the stated environmental quality standard. Dissolved iron (Fe) was 0.3 mg/l which was lower than quality standard value and the highest value of 0.2471 mg/l was found at Lempuing Hilir. Mangaan metal (Mn) was in the range of 0.0161 - 0,0243 mg/l and Zinc (Zn) was in

the range of 0.0865 – 0.4081 mg/l. Cadmium (Cd), Mercury (Hg), Lead (Pb) and Copper (Cu) were not detected by meter.

**c. Free Ammonium**

Surface water (water body) which contain ammonium can be originate from degradation products either through aerobe or anaerobe pathways of nitrogen containing materials such as protein. The existence of ammonium in surface water can produce odor. The allowable maximum ammonium in surface water is 0.5 mg/l. Analysis results of five water samplings in the surrounding of activity plan location showed that ammonium content was in the range 0.07 to 0.12 which was lower than the stated quality standard.

**d. Nitrate and Nitrite**

The magnitude of nitrate and nitrite in water is depend on decomposition level of nitrogen and oxygen by bacteria. High level of nitrite content might be due to the degradation of N-containing compound such as protein. Analysis results of nitrate and nitrite content from seven water samplings in the surrounding of activity location showed that these elements were lower than the quality standard value. Nitrate content was in the range of 0.08 – 0.18 mg/l (BML 10 mg/l), whereas nitrite content was in the range of 0.0102 – 0.0257 mg/l (BML 0,06 mg/l).

**e. Biological Oxygen Demand ( $BOD_5$ )**

Organic matters in surface water which tend to absorb oxygen made water become turbid and has odor because more oxygen is used to decompose organic matter. These organic matters are consisted of carbon, hydrogen and oxygen as well as other compounds such as nitrogen, sulphur and others.

$BOD_5$  value show the degradable organic matter content. This is expressed by numbers of oxygen required for organic matter degradation process. The higher  $BOD_5$  value of surface water, the poorer is the surface water quality. High  $BOD_5$  value results in decreasing of dissolved oxygen. The maximum allowable limit for  $BOD_5$  is 2 mg/l. Analysis results from five samples showed that BOD content was in the range of 1.8 – 1.85 mg/l which was lower than the stated quality standard value.

#### **f. Chemical Oxygen Demand (COD)**

The allowable maximum limit of *Chemical Oxygen Demand* (COD) in surface water is 6 mg/l. The COD value shows the degradable organic and inorganic matters. It can be expressed by numbers of required oxygen for organic and inorganic matters degradation process. The higher COD value of surface water, the poorer is the surface water quality. Similar to BOD<sub>5</sub>, high level of COD will results in dissolved oxygen deficit and disturb the life of water biotas such as nekton (fishes). Analysis results from five samples showed that COD average content was 2 mg/l which was lower than the stated quality standard value.

#### **g. Dissolved Oxygen (DO)**

The life of living organisms within water is depend on water capability to maintain minimal concentration of oxygen needed for their life. Fish is water organism that needs the highest oxygen level followed by invertebrate, whereas bacteria need the least oxygen level. Water biota such as larvae of water insect needs minimum of 5 ppm dissolved oxygen. Minimum concentration of dissolved oxygen for biota life should not less than 6 ppm.

Dissolved oxygen concentration is depend on temperature and atmospheric pressure. Dissolved oxygen concentration at temperature of 20°C and one atmospheric pressure in saturate condition is 9.2 ppm, whereas at temperature of 50°C and one atmospheric pressure in saturate condition is 5.6 ppm. The higher the water temperature, the lower is the saturation level of dissolved oxygen.

The negative impact of dissolved oxygen at low concentration is the death of fishes (nektons) and water animals which need oxygen. On the other hand, dissolved oxygen at higher concentration will made oxygen binds hydrogen which coat the metal surface resulting in faster rate of corrosion process. Analysis results from five samples in the surrounding activity location showed that dissolved oxygen content was low in the range 2.62 – 4.,32 mg/l.

#### **h. Sulphate/Sulphide**

Water acidity is strongly affected by sulphate quantity within water. Sulphate ions in anaerobe condition will be reduced by bacteria into sulphide and subsequently sulphide is changed into sulphide hydrogen. Sulphide hydrogen at aerobe condition is

bacteriologically oxidized into toxic sulphate and has off odor. Analysis results from five samples in the surrounding activity plan location showed that sulphate content was in the range of 13.2 to 25.117 mg/l which was lower than the stated water quality standard. Sulphide content was in the range of 0.0001 -0.0003 mg/l which was lower than the stated quality standard with magnitude of 0.002 mg/l.

#### **i. Oil and Lipid**

Thin layer formed by oil and lipid in surface of water body (specific weight of oil/lipid is lower than water specific density) will inhibit air solubility and sunlight penetration into water resulting in inhibited photosynthesis process in water body. Photosynthesis process in water body will increase dissolved oxygen content. Analysis results at five locations of water body showed that oil and lipid content was 62-82 µg/l which was lower than the environmental quality standard value with magnitude of 1,000 µg/l.

#### **j. Phenol**

The term phenol in water is not only limited to phenol ( $C_6H_5OH$ ), but also involved several organic substance mixture that consisted one or more hydroxyl cluster. Phenol at concentration 0,005 mg/liter in water produce taste and odor which form chlorophenol in reaction with chlorine. Analysis results from five samples in the surrounding activity plan location showed that phenol content was in the range of 0,01-0,2 mg/l which was within the allowable value range of 1 mg/l according to South Sumatra Governor Regulation No.16/2005.

### **3.1.5. The Existing Irrigation System**

Lempuing area is currently has technical irrigation system which was developed through APBN fund in 2008. This system was designed in 2007 to irrigate paddy field rice covering area of 5,000 ha at South Lempuing area in OKI District. This project in fact can only irrigate land area of 1,042 ha at Karang Anyar, Karang Mulya and Cahaya Tani. The existing condition of Lempuing irrigation system was shown in Table 3.7. Pump facilities was not in operation due to high operational cost. Operational cost from government was very limited and farmers cannot afford pump operational cost.

Other irrigation system is not available at Lempuing area, but some farmers irrigate their rice crops by using pump from the aid of Agricultural Department since 2009. However, these pumps were not fully operated due to high operational cost (Table 3.8).

**Table 3.7. The Existing Condition of Lempuing Irrigation System**

| No | Description                           | Remarks  |
|----|---------------------------------------|--|
| 1. | Irrigation Area (Plan)<br>(Developed) | : 5,000 ha<br>: 1,042 ha                                     |
| 2. | Irrigated Area                        | : 0 ha (Broken Pump Equipment)                               |
| 3. | Main Facilities                       |  |
|    | - Pump Station                        | : 1 location (in Macak River)                                |
|    | - Pump Unit                           | : 3 Unit   |
|    | - Pump Capacity                       | : 0.35 m <sup>3</sup> /sec                                   |
|    | - Lifting Pipe                        | : 1 no ( $\Phi = 400$ mm, L = 208 m)                         |
|    | - Lempuing Main Canal                 | : 2,708 m  |
|    | - Cahya Maju Secondary Canal          | : 3,854 m  |
|    | - Main Structures                     | : 11 division structures, 4 culverts,<br>10 culvert drainage |

Source: Ministry of Public Works, 2011

**Table 3.8. Performance of Farmer Pump used for Irrigation at Lempuing.**

| No | Description          | Remarks                 |
|----|----------------------|-------------------------|
| 1. | Number of Given Pump | 4 nos                   |
| 2. | Irrigation Area      | 40 ha (in year of 2009) |
| 3. | Number of Farmers    | 40 Families             |

Source: Ministry of Public Works, 2011

### **3.1.6. The Existing Drainage Condition**

Rivers at Lempuing area are flown into Komering River and discharging into in Musi River. There are seven rivers as main natural drainage at Lempuing area that consisted of Macak, Lempuing, Burnai/Merah, Tembesu, Sepungkur, Sindang and Badak Rivers. Flooded condition is occurred almost every year in flood plain along Lempuing River. Farmers do not plant rice crop or other crops but most of them become brick craftsman. Farmers which plant rice crops only receive the yield less than 1 ton/ha per year. Some river branches were not

flowing properly because of very low velocity. Some areas are flooded every year as described in the following discussions.

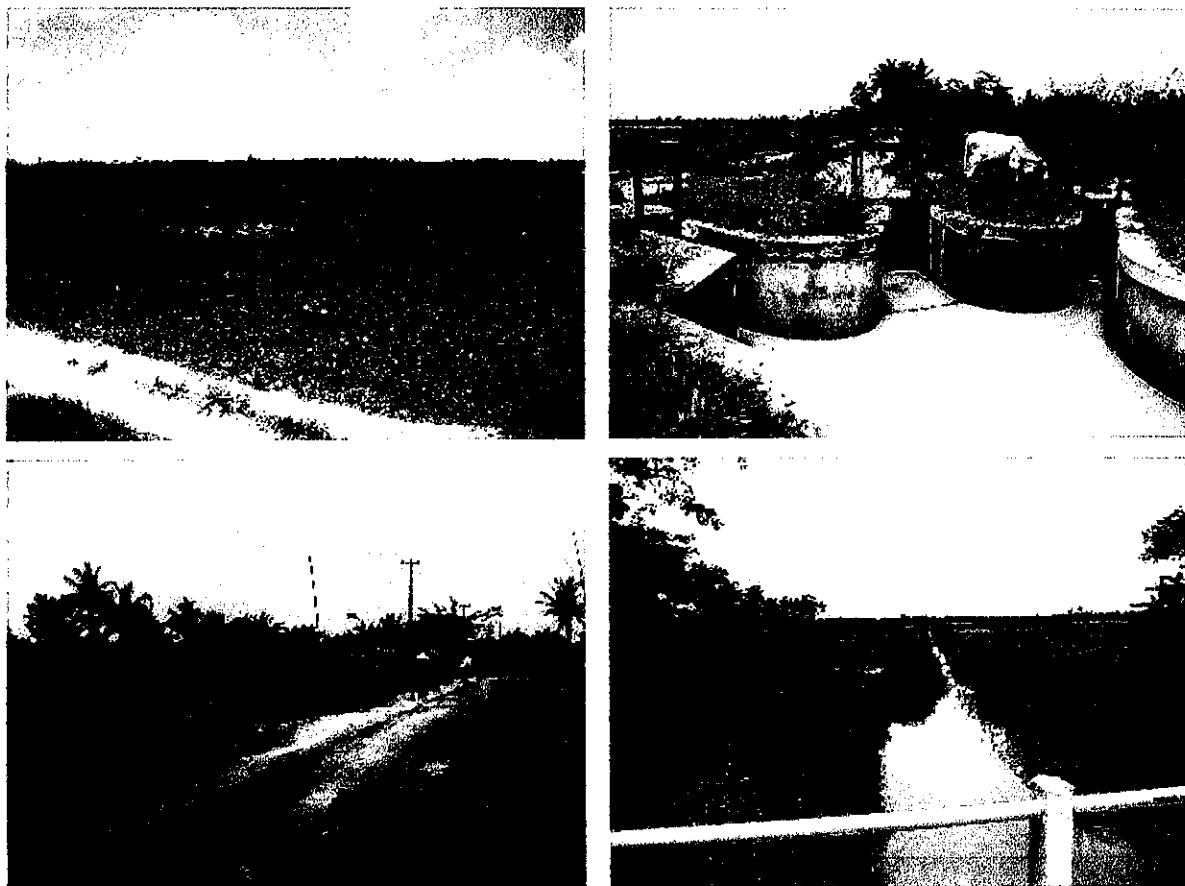


Figure 3.1. The Existing Condition of Lempuing Irrigation System (Ministry of Public Works, 2011)

South Sumatra Province Government in 2006 had constructed drainage canal by using National Expenditure and Revenue Budget (APBN) fund to anticipate and prevent the flooding. The drainage canals are consisted of man-made drainage canal and natural canal which increase the flow (Table 3.9). Clean water supply for daily need was obtained from wells water that were available almost at each community member's house. Wells have depth in the range 4-5 m with water depth of 1.2-1.5 m in west Lempuing area and water depth of 2-4 m in east Lempuing area.

**Table 3.9. Drainage Canal at Lempuing Area**

| <b>Villages</b>            | <b>Length<br/>(km)</b> | <b>Base Width (m)</b> | <b>Depth (m)</b> | <b>Flow<br/>Discharge<br/>(m<sup>3</sup>/sec)</b> |
|----------------------------|------------------------|-----------------------|------------------|---|
| Tulung Harapan             | 5.8                    | 6                     | 1                | 1   |
| Tulung Harapan             | 5.5                    | 8                     | 1.3              | 2   |
| Tugu Agung<br>Harapan Jaya | 15.0                   | 3.5                   | 1.7              | 3   |

Source: Ministry of Public Works, 2011

**Table 3.10. The Flooded Area and Flooded Area that can be Planted with Rice.**

| <b>Sub-district</b>     | <b>Villages</b> | <b>Total Area<br/>(ha)</b> | <b>Flooded Area<br/>(ha)</b> | <b>Flooded area that<br/>can be planted<br/>with rice (ha)</b> |
|-------------------------|-----------------|----------------------------|------------------------------|--|
| <b>Lempuing</b>         |                 |                            |                              |  |
|                         | Cahya Tani      | 838,41                     | 422,72                       | 255,80   |
|                         | Cahya Maju      | 897,62                     | 8,53                         | 4,32   |
|                         | Tebing Suluh    | 1342,74                    | 256,06                       | 132,52   |
|                         | Tulung Harapan  | 465,30                     | 177,92                       | 143,72   |
|                         | Tugu Mulyo      | 1795,31                    | 334,62                       | 334,62   |
|                         | Bumi Agung      | 992,35                     | -                            | -  |
|                         | Sindang Sari    | 901,70                     | 109,85                       | 11,71  |
|                         | Sumber Agung    | 1601,67                    | 232,30                       | 4,63   |
|                         | Tugu Agung      | 696,73                     | 17,90                        | 15,64  |
|                         | Kepahyang       | 1274,16                    | 652,39                       | 109,88   |
|                         | Tugu Jaya       | 1180,34                    | 223,21                       | 193,33   |
|                         | Mekar Jaya      | 830,31                     | 374,59                       | 276,56   |
|                         | Sub Total       | 12816,63                   | 2810,08                      | 1482,74  |
| <b>Lempuing Jaya</b>    |                 |                            |                              |  |
|                         | Lubuk Siberuk   | 1915,16                    | -                            | -  |
|                         | Lubuk Makmur    | 1303,04                    | 351,64                       | 191,04   |
|                         | Sungai Belida   | 1175,81                    | 449,38                       | 322,23   |
|                         | Sub Total       | 4394,00                    | 801,02                       | 513,27   |
| <b>Semendawai Timur</b> |                 |                            |                              |  |
|                         | Karang Anyar    | 964,61                     | 84,32                        | 52,19  |

| <b>Sub-district</b> | <b>Villages</b>  | <b>Total Area (ha)</b> | <b>Flooded Area (ha)</b> | <b>Flooded area that can be planted with rice (ha)</b> |
|---------------------|------------------|------------------------|--------------------------|--|
|                     | Karang Mulya     | 745,48                 | 97,56                    | 82,57  |
|                     | Tulung Harapan   | 1052,03                | 73,06                    | 73,06  |
|                     | Harapan Jaya     | 2487,94                | 553,80                   | 280,41   |
|                     | Wanasari         | 821,12                 | 354,72                   | 267,99   |
|                     | <b>Sub Total</b> | <b>6071,18</b>         | <b>1163,47</b>           | <b>756,27</b>  |
|                     | <b>Total</b>     | <b>23281,82</b>        | <b>4774,58</b>           | <b>2752,23</b>   |

Source: Ministry of Public Works, 2011

### **3.1.7. Komering River Flow Discharge at Perjaya Headworks**

Flow discharge of Komering River was vary according to season. Water was available in abundant quantity during wet season (about December-May) but it was available in very limited quantity during dry season which is equivalence to 40% of maximum discharge. Minimum discharge is usually on August ( $106 \text{ m}^3/\text{second}$ ), average discharge on December-May was  $247 \text{ m}^3/\text{sec}$  and average discharge on June-November was  $138 \text{ m}^3/\text{sec}$ , whereas monthly discharge average during monitoring was  $192 \text{ m}^3/\text{sec}$ . Monthly average discharge that pass through dam (canal headworks) was  $47 \text{ m}^3/\text{sec}$  because this water discharge is used for irrigation water requirement (Ministry of Public Works, 2011). Monthly flow discharge during measurement from 1971 to 2009 period was presented in Appendix 2.

### **3.1.8. Road and Transportation**

The main road in Lempuing area is Lintas Timur road that connect Palembang City with Bandar Lampung. In addition to this road, some roads are also available that connect the main road into the surrounding villages. These roads are also connected to inspection road at Secondary Canal in Belitang. Similar to non-asphalt road in other areas, these roads are difficult to access by motor vehicles especially during wet season. The main roads which are important for transportation activity, especially natural produces, can only be accessed by motor vehicles at wet season.

**Table 3.11. Road Network at Lempuing Area**

| <b>Description</b>            | <b>Remarks</b>              |
|-------------------------------|-----------------------------|
| - National Road (East Bypass) | : 37 km, Asphalt, width 5 m |
| - Province Road               | : 55 km, Asphalt, width 4 m |
| - District Road               | : 23 km, Asphalt, width 3 m |
| - Village Road                | : Without Asphalt           |

Source: Ministry of Public Works, 2011.

### **3.2. Biotic Environment**

#### **3.2.1. Inland Biota (Inland Flora and Fauna)**

Vegetation composition at the study area (in the surrounding of water body and community settlement areas) is consisted of cultivation vegetation in form of farmyard plants. Some vegetation types found in this area are cover crops, fruit plants, food crops as well as decorative plants that increase the aesthetic value in the surrounding of community houses or farmyards.

**Table 3.12. Vegetation abundance at surrounding of study area**

| <b>No</b> | <b>Local Name</b> | <b>Latin Name</b>             | <b>INP</b>   |              |                 |
|-----------|-------------------|-------------------------------|--------------|--------------|-----------------|
|           |                   |                               | <b>Trees</b> | <b>Stake</b> | <b>Seedling</b> |
| 1         | Akalipa           | <i>Acalipha</i> sp            |              | 5,19         |                 |
| 2         | Akasia            | <i>Acacia</i> sp              | 12,41        |              |                 |
| 3         | Angsana           | <i>Pterocarpus indica</i>     | 17,38        |              |                 |
| 4         | Antanan           | <i>Lantana camara</i>         |              | 6,15         |                 |
| 5         | Bambu             | <i>Bambusa vulgaris</i>       |              |              | 22,62           |
| 6         | Bambu pagar       | <i>Bambusa</i> sp             |              | 5,05         |                 |
| 7         | Bambu cina        | <i>Dracaena</i> sp            |              | 16,27        |                 |
| 8         | Belimbing         | <i>Averhoa carambola</i>      | 21,62        |              |                 |
| 9         | Bougenville       | <i>Bougenville</i>            |              | 11,18        |                 |
| 10        | Beringin          | <i>Ficus</i> spp.             | 8,17         |              |                 |
| 11        | Bungur            | <i>Lagerstromia spesiosa</i>  | 7,22         |              |                 |
| 12        | Jagung            | <i>Zea Mays</i>               |              | 10,88        |                 |
| 13        | Ceremai           | <i>Phyllanthus acidus</i>     | 10,12        |              |                 |
| 14        | Karet             | <i>Hevea brasiliensis</i>     | 24,85        |              |                 |
| 15        | Flamboyan         | <i>Delonix regia</i>          | 17,21        |              |                 |
| 16        | Jambu air         | <i>Eugenia aquea</i>          | 29,31        |              |                 |
| 17        | Jambu biji        | <i>Psidium guajava</i>        | 16,1         |              |                 |
| 18        | Jarak             | <i>Ricinus communis</i>       | 20,13        |              |                 |
| 19        | Jati              | <i>Tectona grandis</i>        | 12,4         |              |                 |
| 20        | Jeruk             | <i>Citrus</i> sp              | 6,1          |              |                 |
| 21        | Kedondong         | <i>Spondias dulcis</i>        | 1,2          |              |                 |
| 22        | Kembang Sepatu    | <i>Hibiscus rosa-sinensis</i> |              | 24,3         |                 |

|    |              |                     |       |       |       |
|----|--------------|---------------------|-------|-------|-------|
| 23 | Ketapang     | Terminalia catapa   | 7,15  |       |       |
| 24 | Mangga       | Mangifera indica    | 29,71 |       |       |
| 25 | Melati       | Jasminum sambac     |       | 11,62 |       |
| 26 | Nangka       | Artocarpus integra  | 9,1   |       |       |
| 27 | Pakis        | Gleichenia linearis |       |       | 2,85  |
| 28 | Padi         | Oryza sativa        |       | 21,22 |       |
| 29 | Kelapa Sawit | Elaeis Guineensis   | 25,33 |       |       |
| 30 | Pepaya       | Carica papaya       |       | 15,05 |       |
| 31 | Petai Cina   | Leucaena galuca     | 13,02 |       |       |
| 32 | Pinang       | Areca catechu       | 4,3   |       |       |
| 33 | Pisang       | Musa paradisiaca    |       |       | 26,79 |
| 34 | Pulai        | Alstonia scholaris  | 5,2   |       |       |
| 35 | Puring       | Codiaeum variegatum | 4,1   |       |       |
| 36 | Rambutan     | Nephelium lappaceum | 15,05 |       |       |
| 37 | Rengas       | Gluta renghas       | 7,39  |       |       |
| 38 | Sawo Kecil   | Manilkara sp        | 11,8  |       |       |
| 39 | Seru         | Schima walichii     | 11,1  |       |       |
| 40 | Sirsak       | Anona muricata      | 5,02  |       |       |
| 41 | Sukun        | Arthocarpus altilis | 27,46 |       |       |
| 42 | Tanjung      | Mimusops elengi     | 13,31 |       |       |
| 43 | Trembesi     | Albizia saman       | 10,9  |       |       |
| 44 | Waru         | Hibiscus tiliaceus  | 25,12 |       |       |

Source : Primary Data of Observation Results , 2011

Shelter trees such as acacia, pterocarous indica, sengon, delonix regia, mahogany, teak and mimusops elengi are mostly found in farmyards or in the road edge within the community. In addition, dominant vegetations found in the surrounding of activity plan location are food crops and plantation crops such as rice, rubber and oil palm.

Table 3.13. Wildlife Types at Study Area

| Taxonomy Group | Local Name           | Latin Name                               | Remarks            |
|----------------|----------------------|--|--------------------|
| Mammals        | 1. Kera ekor panjang | <i>Macaca fascicularis</i>               | <i>observation</i> |
|                | 2. Musang            | <i>Paradoxurus</i>                       | <i>interview</i>   |
|                | 3. Tupai             | <i>hermaproditus</i>                     | <i>observation</i> |
|                | 4. Kelelawar         | <i>Tupaia javanica</i>                   | <i>interview</i>   |
|                | 5. Kalong            | <i>Hiposideros</i> sp.                   | <i>interview</i>   |
|                | 6. Tikus rumah       | <i>Pteropus</i> sp.<br><i>Rattus</i> sp. | <i>observation</i> |
| Birds          | 1. Titiran           | <i>Streptopelia</i> sp.                  | <i>observation</i> |
|                | 2. Kutilang          | <i>Pignonotus aurigaster</i>             | <i>observation</i> |
|                | 3. Pipit             | <i>Lonchura malacca</i>                  | <i>observation</i> |
|                | 4. Berbah            | <i>Corvinia</i> sp.                      | <i>observation</i> |
|                | 5. Punai             | <i>Treron</i> sp.                        | <i>observation</i> |

|         |  |   |  |
|---------|--|---|--|
| Aves    | 6. Ayam-ayaman<br>7. But-but<br>8. Burung gereja<br>9. Burung seriti<br>10. Burung Gelatik<br>11. Burung tekukur<br>12. Burung alap-alap | <i>Dipodium javanensis</i><br><i>Centropus bengalensis</i><br><i>Passer montanus</i><br><i>Hirundo sp.</i><br><i>Parus sp.</i><br><i>Streptopelia chinensis</i><br><i>Accipiter sp.</i> | <i>interview</i><br><i>observation</i><br><i>observation</i><br><i>observation</i><br><i>interview</i><br><i>observation</i><br><i>observation</i> |
| Reptile | 1. Ular sawah<br>2. Biawak<br>3. Kadal   | <i>Phyton reticulatus</i><br><i>Varanus saltator</i><br><i>Mabouya multifasciata</i>  | <i>interview</i><br><i>interview</i><br><i>observation</i>   |
| Amphibi | 1. Katak sawah<br>2. Kodok Bangkong  | <i>Rana sp.</i><br><i>Bufo sp.</i>  | <i>observation</i><br><i>observation</i>   |

Source: Primary Data of 2011 based on observation and interview.

The existence of plant types in this area is very important. The vegetation existence from ecology aspect point of view has role in exhaust gas absorption process such as carbon monoxide produced from combustion process of fossil fuel (vehicles). Moreover, plant type diversity in this area has provide habitat for some wild lives especially bird types (aves) and as food resource for some wild lives. Observation results of vegetation type's abundance at the surrounding area that will be developed for irrigation canal can be seen in Table 3.12.

Wild life types of mammals, aves, reptile and amphibi are still found in this area. The wildlife types which are directly found and based on interview with the local community was presented in Table 3.13.

### 3.2.2. Water Biotas

#### 3.2.2.1. Plankton Community

Plankton community is organisms group in which its growth is highly depended on medium quality especially water and highly affected by water current. This community is primary producer in waters ecosystem. The better quality of waters as plankton community habitat produce the higher value of type diversity or index. Decrease in water quality as plankton habitat produce the decrease of type's diversity within community. This study was conducted at flow path of Lempuing River, Macak River and Air Sindang River in the surrounding of activity location plan. Plankton sampling was done on the same location with location of surface water sampling that consisted of A1 (Lempuing

Hulu River), A2 ( Lempuing Hilir River), A3 (Macak Hulu River), A4 (Macak Hilir River) and A5 (Air Sindang River). Results of plankton sampling observation was given in Table 3.14.

There were 16 phytoplankton types and 3 zooplankton types found at sampling location of Lempuing river in upstream side (A1). Total types of plankton community was 19 types with total abundance of 112 individual/l water. Diversity index was 2.678 which showed that type diversity in this waters area was relatively good. It is important to note that the study area is upstream side of waters with no community settlement and has pebble and sand mining activities, rubber plantation, water transportation lane and many tree types in river edges.

Table 3.14. Plankton Community in Waters at Study Area

| <b>Taxonomy/Type</b>      | <b>Sampling Locations</b> |           |           |           |           |
|---------------------------|---------------------------|-----------|-----------|-----------|-----------|
|                           | <b>A1</b>                 | <b>A2</b> | <b>A3</b> | <b>A4</b> | <b>A5</b> |
| <b>PHYTOPLANKTON</b>      |                           |           |           |           |           |
| <b>Chlorophyceae</b>      |                           |           |           |           |           |
| <i>Cladophora sp.</i>     | 4                         | 8         | 12        | 8         | -         |
| <i>Coemarium sp.</i>      | 16                        | 5         | -         | -         | 3         |
| <i>Ankistrodesmus sp.</i> | 4                         | -         | -         | 4         | -         |
| <i>Ulothrix sp.</i>       | 12                        | 8         | 2         | 4         | 3         |
| <i>Scenedesmus sp.</i>    | 6                         | 2         | 4         | 2         | -         |
| <i>Oedogonium sp.</i>     | 2                         | -         | 2         | -         | -         |
| <i>Micrasterias sp.</i>   | -                         | 2         | -         | 2         | -         |
| <b>Bacillariophyceae</b>  |                           |           |           |           |           |
| <i>Achnanthes sp.</i>     | 12                        | 8         | 4         | 8         | 2         |
| <i>Gomphonema sp.</i>     | 4                         | 6         | -         | -         | 4         |
| <i>Cymbella sp.</i>       | -                         | -         | -         | 2         | -         |
| <i>Cyclotella sp.</i>     | 2                         | -         | 2         | -         | 4         |
| <i>Synedra sp.</i>        | 8                         | 6         | 6         | -         | 6         |
| <i>Coscinodiscus sp.</i>  | -                         | 12        | 2         | 6         | -         |
| <i>Pinnularia sp.</i>     | 4                         | -         | 6         | 2         | -         |
| <i>Navicula sp.</i>       | 12                        | 4         | 6         | -         | 4         |
| <i>Nitzchia sp.</i>       | 8                         | -         | 12        | 6         | 6         |
| <b>Cyanophyceae</b>       |                           |           |           |           |           |
| <i>Oscillatoria sp.</i>   | 6                         | 10        | -         | -         | 4         |
| <i>Lingbya sp.</i>        | -                         | -         | 2         | 2         | -         |
| <i>Spirulina sp.</i>      | 2                         | -         | -         | -         | -         |
| <i>Microcystis sp.</i>    | 6                         | 14        | -         | 4         | 6         |
| <b>ZOOPLANKTON</b>        |                           |           |           |           |           |
| <i>Phacus sp.</i>         | -                         | 2         | 4         | 2         | 6         |
| <i>Arcella sp.</i>        | 4                         | 2         | -         | -         | 2         |
| <i>Cyclops sp.</i>        | 2                         | 6         | 8         | 6         | -         |
| <i>Difflugia sp.</i>      | -                         | -         | -         | -         | 4         |
| <i>Nauplius sp.</i>       | 2                         | 2         | 1         | -         | 2         |

|                   |  |             |             |              |             |
|-------------------|--|-------------|-------------|--------------|-------------|
| Total types       | 19   | 16          | 15          | 14           | 14          |
| Abundance (ind/l) | 112  | 97          | 73          | 58           | 56          |
| Shannon diversity | <b>2.678</b>   | <b>2.59</b> | <b>2.48</b> | <b>2.505</b> | <b>2.57</b> |
| Source            | : Primary Data, 2011   |             |             |              |             |
| Remarks           | : A1 : Lempuing Hulu River; A2 : Lempuing Hilir River; A3 : Macak Hulu River; A4 : Macak Hilir River, and A5 : Air Sindang River |             |             |              |             |

Laboratory observation of plankton community at A2 sampling location (downstream of Lempuing) showed 16 plankton types consisting of 12 phytoplankton types and 4 zooplankton types with total of 97 individual/l water. Diversity index of plankton community at A2 was relatively lower than that of sampling location at upstream Lempuing with magnitude of 2.59. This was supported by water quality analysis results which showed that COD and BOD values were higher than environmental quality standard value due to community activities such as bathing, washing and latrine (MCK) which depend on river. The activities found in this location were shrimp catching, sand mining as well as rubber and oil palm plantations which increase water turbidity.

There were 15 plankton types that consisted of 12 phytoplankton types and 3 zooplankton types at sampling points of Macak River Upstream (A3). The distribution was relatively homogenous having total plankton of 73 individual/l water and the lowest diversity level was 2.48 showing the stable condition of waters. There was no rubber plantation area and river sand dredging activity in this location.

Activity of sand mining and plantation were also found during observation of plankton community at downstream side of Macak river (A4 sampling location). This location has no decrease of community types, but has significant differences in type composition. There were 14 plankton types that consisted of 12 phytoplankton types and 2 zooplankton types at this sampling points. Zooplankton type found in water sample at this location was relatively similar to the type found at other sampling locations. The observed total plankton was 58 individual/l water having relatively high diversity index with magnitude of 2.505.

Plankton types found at location of Air Sindang River (A5) was 14 types which consisted of 10 phytoplankton types and 4 zooplankton types. Type abundance was 56 individual/l water and diversity index of 2.57. Therefore, diversity index value for the whole location was in the range of 2.48-2.67 showing stable condition of waters that capable to support the life of waters biota.

### 3.2.2.2. Macrozoobenthos Community

Benthos is organisms group which live on river base substrate, sessil or relatively static because some benthos types cannot mobile or not affected by water current. This animal is frequently used as indicator for the occurrence of local waters quality change.

Table 3.15. Macrozoobenthos Community in Waters at Study Area

| Taxonomy/Type                               | Sampling Locations |       |       |       |       |
|---|--------------------|-------|-------|-------|-------|
|   | A1                 | A2    | A3    | A4    | A5    |
| <b>ANNELIDA</b>                             |                    |       |       |       |       |
| <i>Annelida spp.</i>                        | 12                 | 4     | 12    | 14    | 6     |
| <b>OLIGOCHAETA</b>                          |                    |       |       |       |       |
| <i>Limnodrillus sp.</i>                     | 6                  | 8     | 8     | 10    | 4     |
| <b>DIPTERA</b>                              |                    |       |       |       |       |
| <i>Chironomidae</i>                         | 5                  | -     | 4     | 4     | -     |
| <i>Polypedilum sp.</i>                      |                    | 2     | -     | -     | 3     |
| <i>Thienemani mya sp.</i>                   | 4                  | -     | 2     | -     | -     |
| <b>MOLLUSCA</b>                             |                    |       |       |       |       |
| <i>Musculium sp.</i>                        | 4                  | -     | 2     | 2     | 6     |
| Type Numbers                                | 5                  | 3     | 5     | 4     | 4     |
| Abundance (Individual/400 cm <sup>2</sup> ) | 31                 | 14    | 28    | 30    | 19    |
| Diversity Index (H')                        | 1,507              | 0,955 | 1,376 | 1,171 | 1,347 |

Source : Primary Data, 2011

There was 4 macrozoobenthos groups consisting of Annelida, Oligochaeta, Diptera and Mollusca based on laboratory identification of substrate samples. Seven sediment samples taken from four locations showed that *Annelida* sp. type and *Limnodrillus* sp. (Oligochaeta class) type are always found in each observed substrate. These types are generally found on substrate having high organic matter content.

Benthos abundance was 31 individual per 400 cm<sup>2</sup> based on observation result of substrate from upstream Lempuing River at A1 location (upstream side waters). This was the highest number compared to the number found at other waters and having diversity index of 1.507 because this location had scarce community settlement and activity.

Makrozoobenthos community at downstream Lempuing location (A2) was 14 individual per 400 cm<sup>2</sup>, but it had only 3 makrozoobenthos types. Low value of diversity index at this location (0.955) because substrate type was muddy and there was high flow in downstream side so that only some macrozoobenthos types were capable to adapt.

There was 28 individual/400 cm<sup>2</sup> with 5 types of benthos animal having diversity index of 1.376 found on substrates of Macak river at A3 location (upstream side waters). There was sand mining activity at upstream of Macak river which change substrate within waters and affect the existing benthos diversity.

At monitoring location of downstream Macak river (A4), there was 30 individual/400 cm<sup>2</sup> which composed of 4 benthos types and diversity index of 1.171. Substrate condition has supports some types of benthic animal of annelida and oligochaeta groups. Monitoring location at Air Sindang River showed that there were 4 benthos animal types with abundance of 19 individual/ 400 cm<sup>2</sup> and diversity index of 1.347. Substrate type in this location was more stable and relatively homogenous.

From type number point of view, there was no drastic decrease of type numbers from sampling points. The macrozoobenthos type numbers at each location in general was relatively low in the range of 3 – 5 types. Macrozoobenthos diversity index at five sampling points based on Shannon diversity index was classified as relatively low in term of waters biota quality. This might due to relatively turbid waters condition. This turbidity might due to relatively high sedimentation level (silting up as a results of high level of sand sedimentation and materials carried from river upstream side).

### **3.2.2.3. Nekton**

Nekton is a mobile waters biota, especially of fish group. Fish is one of waters organisms that can be used as detector for waters quality or bioindicator because fish has extensive coverage.

Fish at trophic level is a consumer (either primary or secondary) so that its existence is depend on foods especially plankton, benthos or other waters animal groups. Based on primary data in the field, interview, observation on community catching fish as well as secondary data from Pusat Riset Perikanan Tangkap and Badan Riset Kelautan dan Perikanan, the general fishes found at Lempuing, Macak and Air Sindang Rivers were given in Table 3.16.

**Table 3.16. Fish Data in the Vicinity of Study Area**

| No | Species                            | Local Name    | Abundance |
|----|------------------------------------|---------------|-----------|
| 1  | <i>Acanthopsis choirorchinchus</i> | Julung-julung | +++       |
| 2  | <i>Anabas testudineus</i>          | Betok         | +++       |
| 3  | <i>Bagroides melapterus</i>        | Baung munti   | +         |
| 4  | <i>Belodontychys dinema</i>        | Sengarat      | +         |
| 5  | <i>Belontia hasselti</i>           | Selincah      | ++        |
| 6  | <i>Eleutheronema tridactylum</i>   | Senangin      | +         |
| 7  | <i>Gymnothorax tile</i>            | Belut         | +         |
| 8  | <i>Pangasius polyuranodon</i>      | Juaro         | ++        |
| 9  | <i>Macrones nemurus</i>            | Baung         | ++++      |
| 10 | <i>Notopterus notopterus</i>       | Putak         | +         |
| 11 | <i>Ophiocephalus striatus</i>      | Gabus         | +++       |
| 12 | <i>Rasbora agyrotaenia</i>         | Seluang       | +++       |
| 13 | <i>Cryptopterus</i> sp.            | Lais          | +++       |
| 14 | <i>Clarias batracus</i>            | Lele          | ++        |
| 15 | <i>Helicophagus typus</i>          | Patin         | ++        |
| 16 | <i>Trichogaster</i> sp.            | Sepat siam    | +++       |
| 17 | <i>Ophiocephalus micropeltes</i>   | Toman         | +         |

Source: Based on observation, interview and secondary data from Research Council of Oceanography and Fishery

Inventarization results based on interview with community members showed that abundance and diversity of fish community were relatively heterogenous because the study location was located at river flow area as outlet for some small rivers. Fish types composition showed that there were some fish types which have economic value that can be used as protein source for family and mostly catched by the community members. Data also showed that there was no scarce or protected fish such as Belida which can be found currently at upstream waters of Musi River Watershed.

### **3.3. Social, Economic, Cultural and Community Health Environment**

#### **3.3.1. Demographic Aspect**

Population growth rate per Sub-district at OKU Timur District was heterogenous, but the average value for each District was about 0.95% in 2005 and increase to 1.84% in 2007 and subsequently decrease to 0.86 percent in 2009. Population growth at OKU Timur District was below the average value of national population growth with magnitude 1.50% per year. This fluctuating growth pattern was due to OKU Timur District as a new extension Districts which become migration movement destination that can be seen from population growth since 2005.

Population number of Ogan Komering Ulu Timur District based on OKUT in Number (2009) was 581,665 inhabitants (307,124 male and 292,780 female) consisting of 157,455 head of families. This population number was higher than that of 2004 with magnitude of 561,932 inhabitants. About 35 percent of inhabitant live in cities and 65 percent live in villages. Population number of OKUT in 2006 was 577,843 inhabitants that consisted of 297,177 male and 280,666 female. OKU Timur District was divided into 20 Sub-district areas, whereas the study area is located at Semendawai Timur Sub-district.

Population growth rate at OKI District in average was about 1.35% in 2005 and increase to 1.84% in 2007 and subsequently decrease to 1.60% in 2009. Population growth at OKI District was still above the average value of national population growth with magnitude 1.50% per year. Population number of Ogan Komering Ilir District based on OKI in Number (2009) was 707,627 inhabitants (341,126 male and 353,813 female) consisting of 196,476 head of families. OKU Timur District was divided into 20 Sub-districts area and OKI District was divided into 14 Sub-districts area, whereas the study area was located at Lempuing Sub-district and Semendawai Timur Sub-district. Study area location was shown in Table 3.17.

Table 3.17. Population Number and Head of Family at Study Area

| <b>Sub-district/Village</b> | <b>Male</b> | <b>Female</b> | <b>Numbers</b> | <b>Head of Family</b> |
|-----------------------------|-------------|---------------|----------------|-----------------------|
| <b>Semendawai Timur</b>     |             |               |                |                       |
| 1 Karang Anyar.             | 1363        | 1222          | 2585           | 585                   |
| 2 Tulung Harapan.           | 1426        | 1331          | 2757           | 657                   |
| 3 Karang Mulya.             | 931         | 890           | 1821           | 414                   |
| 4 Harapan Jaya.             | 1762        | 1597          | 3359           | 786                   |

|                      |                  |      |      |      |      |
|----------------------|------------------|------|------|------|------|
| 5                    | Karang Melati    | 1740 | 1887 | 3627 | 611  |
| 6                    | Melati Agung     | 1241 | 1270 | 2511 | 968  |
| 7                    | Karang Menjangan | 1762 | 1597 | 3359 | 786  |
| <b>Lempuing</b>      |                  |      |      |      |      |
| 1                    | Cahya Tani.      | 1801 | 1877 | 3678 | 877  |
| 2                    | Cahya Maju.      | 1608 | 1838 | 3446 | 828  |
| 3                    | Tugumulyo.       | 4880 | 5097 | 9977 | 2281 |
| 4                    | Tulung Harapan.  | 877  | 1116 | 1993 | 418  |
| 5                    | Bumi Agung.      | 1918 | 2131 | 4049 | 936  |
| 6                    | Sumber Agung.    | 2210 | 2432 | 4642 | 1051 |
| 7                    | Tebing Suluh.    | 1910 | 2912 | 4822 | 1058 |
| 8                    | Sindang Sari.    | 1234 | 1325 | 2559 | 660  |
| 9                    | Tugu Agung.      | 1818 | 2051 | 3869 | 844  |
| 12                   | Kepayang.        | 1731 | 1791 | 3522 | 803  |
| <b>Lempuing Jaya</b> |                  |      |      |      |      |
| 1                    | Lubuk Seberuk    | 3229 | 2955 | 6184 | 1520 |
| 2                    | Lubuk Makmur     | 1953 | 1887 | 3840 | 852  |
| 3                    | Sungai Belida    | 2769 | 2720 | 5489 | 1965 |

Source: Sub-district Monograph, 2011.

Population distribution pattern at OKU Timur District was uneven with average population density of 178.00 inhabitant/km<sup>2</sup>. Other locations having less area was inhabited by more than 65% of total inhabitants. These were shown by higher population density level at Sub-district capital which had public service access or government access.

Population composition based on age can be described as follows : 35.71% within age of 0 to 14 years, 57.7% within age of 15 to 50 years and 6.55% for age of more than 60 years. This age composition showed that numbers of productive age inhabitant was higher than other age compositions. Compared to population census in 2000, 0-14 age group had decreased and productive age group (15-59) as well as advanced age group (>60) had increased. This showed that the age structure had changed into older age which indicated relatively good socio-economic condition and higher dependency ratio (62.27 percent). The dependency ratio number was 62.27 based on age group. It means that 100 productive people should support 62 unproductive people.

Table 3.18. Population Number Based on Age Structure, 2009/2010.

| No. | Age     | District |         | Lempuing Sub-district |      | Lempuing Jaya Sub-district |       | Semendawai Timur Sub-district |      |
|-----|---------|----------|---------|-----------------------|------|----------------------------|-------|-------------------------------|------|
|     |         | OKI      | OKUT    | Lk                    | Lk   | Pr                         | Pr    | Lk                            | Pr   |
| 1   | 0 - 4   | 59.881   | 63.587  | 1401                  | 1067 | 1063                       | 1311  | 1067                          | 1063 |
| 2   | 5 - 9   | 70.012   | 70.055  | 1638                  | 1249 | 1154                       | 1456  | 1249                          | 1154 |
| 3   | 10 - 14 | 74.870   | 80.216  | 1757                  | 1340 | 1324                       | 1671  | 1340                          | 1324 |
| 4   | 15 - 19 | 69.434   | 72.958  | 1582                  | 1205 | 1129                       | 1425  | 1205                          | 1129 |
| 5   | 20 - 24 | 55.091   | 56.684  | 1145                  | 873  | 837                        | 1057  | 873                           | 837  |
| 6   | 25 - 29 | 63.530   | 49.624  | 983                   | 749  | 764                        | 963   | 749                           | 764  |
| 7   | 30 - 34 | 52.841   | 40.351  | 822                   | 627  | 620                        | 782   | 627                           | 620  |
| 8   | 35 - 39 | 56.943   | 38.292  | 799                   | 608  | 604                        | 762   | 608                           | 604  |
| 9   | 40 - 44 | 47.349   | 31.093  | 666                   | 508  | 464                        | 585   | 508                           | 464  |
| 10  | 45 - 49 | 42.280   | 24.311  | 499                   | 380  | 361                        | 456   | 380                           | 361  |
| 11  | 50 - 54 | 29.428   | 18.777  | 406                   | 309  | 307                        | 389   | 309                           | 307  |
| 12  | 55 - 59 | 17.071   | 14.625  | 325                   | 248  | 225                        | 284   | 248                           | 225  |
| 13  | 60 - 64 | 18.235   | 14.392  | 289                   | 219  | 227                        | 287   | 219                           | 227  |
| 14  | 65 - 69 | 11.841   | 9.628   | 199                   | 151  | 159                        | 200   | 151                           | 159  |
| 15  | 70 - 74 | 18.449   | 8.233   | 197                   | 150  | 125                        | 157   | 150                           | 125  |
| 16  | 75 +    | 18.372   | 6.978   | 153                   | 117  | 94                         | 118   | 117                           | 94   |
|     | Total   | 707.627  | 581.665 | 12861                 | 9800 | 9457                       | 11933 | 9800                          | 9457 |

Source : OKI and OKUT in Number, 2009/2010

Population distribution pattern at OKI District was uneven with average population density of 178.00 inhabitant/km<sup>2</sup>. This was shown by higher population density level at Sub-district capital that has public service access or government access than other areas. Population composition based on age can be described as follows : 35.71% within age of 0 to 14 years, 57.74% within age of 15 to 50 years and 6.55% for age of more than 60 years. This age composition showed that numbers of productive age inhabitant was higher than other age compositions. Compared to population census in 2000, 0-14 age group had decreased and productive age group (15-59) as well as advanced age group (>60) had increased. This showed that the age structure had changed into older age which indicated relatively good socio-economic condition and higher dependency ratio (57.26 percent). The dependency ratio number was 57.26 based on age group. It means that 100 productive people should support 58 unproductive people.

### 3.3.2. Livelihood

Most community members at study area either in Lempuing Sub-district or Semendawai Timur Sub-districts has livelihood as rubber farmer (65% of population) and others have livelihood as paddy field rice and rainfed rice famers as well as workers. Some of rice yield was consumed and the rest was sold. In addition to income from

rubber and rice, community members also have income from farmyard cultivation yield such as cowpea, corn, vegetables and watermelon.

These second crops are usually grown at newly opened rubber plantation in which rubber trees are not tall (their canopy is sparse). Rubber price is getting better and current price is Rp. 20.000,-/kg. Land area for rubber plantation owned by the community members was heterogenous in the range of 1 to 4 hectare. Land ownership from most of community members is non-certificate ownership.

One hectare of rubber plantation has 450-500 trees. Rubber plant at 9 year old produce about 50-60 kg of latex per week (3 times tapping) with selling price about Rp. 20,000/kg producing income of 4 to 4.8 million rupiahs per month per ha. This income is not stable because the price of latex is fluctuative in nature. Some community members comment that current latex price is relatively high and it might decrease to 4 thousand rupiahs per kilogram in other time. Community also had breeding activity, especially cows in addition to farming. Some of community members or households in average have 2-4 cows that was freely herded in the field available at surrounding of village. These breed animals are used as saving for farmers.

### **3.3.3. Education**

Human resource quality from educational aspect can be judged from human development index number. Human Development Index is one of measurement indicator which show human development achievement in an area or state. Human development index is expressed in three dimensions of human development consisting life length that is measured by life expectation at moment of born, education that is measured by average length of schooling and literate number as well living standard that is measured by expenditure per capita.

Human development index at OKU Timur District in 2007 was 68.14 or at the order of 375 from 440 District/City in Indonesia and increase to 69.39 in 2009 but at the same order.

School participation number in 2009 for elementary school age group (7-12) was 97.76 percent, 13-15 age group was 85.48 percent and 16-18 age group was 59.81 percent. Literate level for community members having age more than 15 years was 94.67 percent in 2009 which was increased than the number in previous years. Illiterate

number in 2005 was 9.1% and decrease to 5.33% in 2009 according to Statistical Center Council of South Sumatra Province.

Numbers of educational facility and infrastructure were as follows : Early Age Children Education (PAUD) was 183 schools, Kindergarten School was 17 units of state status and 103 units of private status. State Elementary School was 416 units and Private Elementary School was 14 units; State Junior High School was 46 units distributed at each Sub-district and Private Junior High School was 32 units ; State Senior High School was 15 units and Private Senior High School was 20 units; Private University was consisted of 5 University units and 1 Academy unit with various departments such as agriculture, husbandry, plantation and economics. Human development index for OKI District in 2007 was 69.15 and increase to 70.06 in 2009 although it was lower than the average value of Province.

School participation number in 2009 for elementary school age group (7-12) was 97.00 percent, 13-15 age group was 73.57 percent and 16-18 age group was 42.05 percent. Literate level for community members having age more than 15 years was 95.24 percent in 2009 which was increased than the number in previous years. Illiterate number in 2005 was 8.7% and decrease to 4.76% in 2009 according to Statistical Center Council of South Sumatra Province.

Table. 3.19. Education Facilities at Study Area

| No.                         | Sub-district/Village | TK |   | SD/MI |   | SMP/MTs |   | SLTA |   |
|-----------------------------|----------------------|----|---|-------|---|---------|---|------|---|
|                             |                      | N  | S | N     | S | N       | S | N    | S |
| <b>I Lempuing</b>           |                      |    |   |       |   |         |   |      |   |
| 1                           | Tulung Harapan       | -  | 1 | 1     | 1 | -       | 1 | -    | - |
| 2                           | Bumi Agung           | -  | 1 | 2     | 2 | -       | 1 | -    | 1 |
| 3                           | Tugu Mulyo           | -  | 1 | 1     | 2 | -       | 1 | -    | 1 |
| 4                           | Cahya Tani           | -  | 1 | 4     | 2 | 1       | 2 | -    | 1 |
| 5                           | Cahya Maju           | -  | 1 | 2     | 1 | -       | 1 | -    | 1 |
| 6                           | Tebing Suluh         | -  | 1 | 4     | 1 | -       | 3 | -    | 1 |
| 7                           | Sindang Sari         | -  | 1 | 2     | 2 | -       | 1 | -    | 1 |
| 8                           | Sumber Agung         | -  | 1 | 3     | 2 | -       | 2 | -    | 1 |
| 9                           | Tugu Agung           | -  | 2 | 4     | 3 | 1       | 2 | 1    | 1 |
| 10                          | Kepayang             | -  | 1 | 3     | 1 | -       | 1 | -    | 1 |
| <b>II Lempuing Jaya</b>     |                      |    |   |       |   |         |   |      |   |
| 11                          | Lubuk Siberuk        | -  | - | 1     | 1 | -       | 1 | -    | 1 |
| 12                          | Lubuk Mamur          | -  | 1 | -     | 1 | 1       | - | 1    | 1 |
| 13                          | Sungai Belida        | -  | - | 1     | 2 | -       | 1 | -    | 1 |
| <b>III Semendawai Timur</b> |                      |    |   |       |   |         |   |      |   |

|    |                  |   |   |   |   |   |   |   |   |
|----|------------------|---|---|---|---|---|---|---|---|
| 16 | Karang Anyar     | - | 1 | 1 | - |   | 1 | - | - |
| 17 | Karang Mulya     | - | 1 | 1 | - | 1 | - | 1 | 1 |
| 18 | Tukung Harapan   | 1 | 1 | 1 | 1 | 1 | - | - | 1 |
| 19 | Harapan Jaya     | - | 1 | 1 | - | 1 | - | 1 | 1 |
| 20 | Karang Melati    | - | - | 1 | - | - | 1 | - | - |
| 21 | Melati Agung     | - | 1 | 2 | 1 |   | 1 |   |   |
| 22 | Karang Menjangan | - | 1 | 1 | 1 | 1 | - | - | 1 |

Source: Lempuing and Semendawai Timur Sub-district in Numbers, 2009/2010.

Note: N= State; S= Private; TK = Kindergarten School; SD/MI = Elementary School; SMP/MTs = Junior High School; SLTA = Senior High School.

Numbers of educational facility and infrastructure were as follows : Early Age Children Education (PAUD) was 213 schools, Kindergarten School was 12 units of state status and 67 units of private status. State Elementary School was 448 units, Private Elementary School was 6 units and Islamic Elementary School was 54 units; State Junior High School was 74 units distributed at each Sub-district, Private Junior High School was 31 units, State Islamic Junior High School was 2 units and Private Islamic Junior High School was 62 units ; State Senior High School was 23 units and Private Senior High School was 18 units, State Vocational School was 3 unit, Private Vocational School was 5 units and Private Islamic Senior High School was 27 units as well as some Private Universities.

### 3.3.4. Manpower

More than 65 percent of community livelihood in District OKU Timur District was in agricultural sector. Open unemployment level is decreasing from year to year in which open unemployment in 2005 was 9.79 percent (5.65 male and 18.38 female) and open unemployment in 2009 was 5.51 percent.

Manpower Participation Level was increase from 68.89 percent in 2003 to 71.10 percent in 2005, but it was decrease to 68.30 percent in 2009. Manpower Participation Level describes the magnitude of manpower involvement and it is used to determine the change and trend of manpower in an area. Dependency ratio level is calculated by dividing inhabitants which have 10 year age or more than 15 years that are classified as manpower by total inhabitants at age of 10 year or more than 15 years and multiply by 100 percent. The dependency ratio number at OKU Timur District was 47.54 percent based on age group. It means that 100 productive people should support 48 unproductive people.

More than 60 percent of community livelihood in OKI District was in agricultural sector. Open unemployment level was decreasing from year to year in which open unemployment in 2005 was 9.73 percent and open unemployment in 2009 was 7.04 percent. The dependency ratio number at OKI District was 48.02 percent based on age group. It means that 100 productive people should support 48 unproductive people.

Manpower Involvement Level was increase from 2005, but it was decrease to 67.45 percent in 2009. Manpower Involvement Level describes the magnitude of manpower involvement and it is used to determine the change and trend of manpower in an area. Manpower Involvement Level is calculated by dividing inhabitants which have 10 year age or more than 15 years that are classified as manpower by total inhabitants at age of 10 year or more than 15 years and multiply by 100 percent.

By examining the indicator of open unemployment level and manpower participation level, then manpower plan should be adjusted accordingly. The government, especially universities, should consider and prioritize the skill of graduates in term of quality aspect according to the predicted requirement in fulfilling the demand of manpower market. Disequilibrium of manpower will make the local community members unprepared to face and utilize the available opportunities.

### **3.3.5. Socio Cultural**

Community heterogeneity at Ogan Komering Ulu Timur and Ogan Komering Ilir Districts is similar to the community plurality at other District/City in South Sumatra. Some ethnics were found in these Districts either the incoming ethnics or origin ethnics which were distributed at village or city areas. Social processes in plural community are very dynamics and heterogenous that produce harmony or interest frictions. This society has probability to form concentrated community settlement based on equality of ethnics, religion, profession, socioeconomic status or even politic. This in turn will affect social interaction pattern within one community at a settlement location and between communities. The same thing will affect social harmony and social conflict in community. The similarity of social, economy, political, cultural and religion aspects within settlement will create probability of harmony relationship within the community. On the other hand, the differences will create potential for social conflict.

Based on Population Census in year of 2010, Statistical Center Council had categorized ethnics in South Sumatra, including the two districts above, into 8 groups consisting of Java, Malay, Komering, Melayu Musi Sekayu, Melayu Enim, Melayu Pegagan, Melayu Palembang and others. Population of Java, Komering and Malay ethnics were higher than other ethnics. However, there were some communities that have identity, language and custom which were significantly different one to another in daily life.

Ethnics in South Sumatra generally use one of language originate from Malay area as a part of Austronesia language. According to Fox (1988), ethnics culture in South Sumatra always use myth and history related to their origin so that they always refer to their ancestor (puyang) for genealogy and ethnic identity. Ancestor is used as ethnic identity in their life and as cultural value orientation, ritual ceremony, devotional visit, heirloom and knowledge that are handed down from their ancestors.

Ethnics in OKU Timur or OKI district are heterogenous, but ethnic area identity was unchanged. Ethnic identity in several decades was no more related to ethnic names, but its use territory identity by using river names and area topographic condition.

Although ethnics in OKU Timur or OKI district generally have their own identities and puyangs, serious social conflict due to ethnics differences was scarce. This was probably due to the fact that ethnics which have their own identities were actually clans that originate from one puyang. However, puyang concept available in ethnics has function as adhesive and emotional solidarity. Ethnics diversity at this decentralization era has function as social capital and social integration source based on mutual respect amongst ethnic groups.

This social capital can be used as potential and strength source for human in their community life. In this perspective, individual and community are not considered as separate strength, but as integrated and synergic collective strength that can be used as social resources or capital for their community development. Social resources within plural or heterogenous community can produce social energy that capable to trigger the process of development growth. This social energy consisted of all social elements, community creativity potential, initiative and ideas developed within community that can be integrated into development strength. Social energy can come from activity of individual, community, families, groups, organization, social organization or community groups (ethnics and religions). Social energy can be constructive or destructive depending on

management of social system. Social energy can be processed into dynamic power that can trigger development if social system has flexibility and high innovation.

Social dynamics for plural community at OKU Timur and OKI districts can be highly developed that will produce high energy. The government has duty to provide facilities so that this social energy can be directed and managed properly in order to produce constructive power for development, or vice versa.

One of the method to distribute social energy is to developed social regulations available in the community. Therefore, local government should be act as the community servant, not as power authority. Local government has a role to facilitate and to expose the potential available in community not by using top-down approach, but based on participative development by involving community members as development actors in their community. Partnership, solidarity interaction and life togetherness should be developed amongst members, groups and community institutions based on trust. Social energy development can be considered as social potential that can be managed and developed as potential to create local revenue.

### **3.3.6. Health**

One of important dimension as indicator of human resource quality is community health level. Disease pattern that affect the community members was not change, i.e. infection as specific disease in tropical area. Disease types generally found in this area are diarrhea, skin disease, malaria and tuberculosis (TBC). Prevalence of malaria and tuberculosis diseases was relatively high.

Table 3.20. Predominant Diseases at Community Health Center (Puskesmas) and Pustu

| <b>No</b> | <b>Diseases</b>           | <b>Sub-district</b> |                      |                         |
|-----------|---------------------------|---------------------|----------------------|-------------------------|
|           |                           | <b>Lempuing</b>     | <b>Lempuing Jaya</b> | <b>Semendawai Timur</b> |
| 1         | Skin                      | 680                 | 511                  | 32                      |
| 2         | Malaria                   | 12                  | 14                   | 126                     |
| 3         | Breathing Tract Infection | 272                 | 287                  | 176                     |
| 4         | Hypertension              | 220                 | 196                  | 72                      |
| 5         | Rheumatic                 | 304                 | 212                  | 29                      |
| 6         | Diarrhea                  | 88                  | 24                   | 268                     |
| 7         | Worm                      | 240                 | 11                   | 40                      |
| 8         | Tuberculosis (TBC)        | 33                  | 6                    | 10                      |
| 9         | Ear                       | 72                  | 56                   | 16                      |
| 10        | Others                    | 328                 | 102                  | 126                     |

Source : Community Health Center, 2009/2010

The health problem in this area was availability of medical manpower. OKUT and OKI Districts had limited medical power. OKU Timur district had only 26 general physicians, 9 specialist physicians, 3 dentists and 152 midwives that provide services for OKUT population of more than 599,904 inhabitants. Each Sub-district area had no even distribution of physicians. Physicians was only concentrated in Martapura and Buay Madang Cities. Midwives and nurses had relatively even distribution (65 midwives and 209 village midwives as well as 260 nurses).

Table 3.21. Health Facility and Infrastructure at Study Location

| No                          | Sub-district/Village | Health Facilities |                         |       |                   |
|-----------------------------|----------------------|-------------------|-------------------------|-------|-------------------|
|                             |                      | Hospital          | Community Health Center | Pustu | Physician/Midwife |
| <b>I. Lempuing</b>          |                      |                   |                         |       |                   |
| 1                           | Tulung Harapan       | -                 | -                       | -     | -/1               |
| 2                           | Bumi Agung           | -                 | -                       | -     | 1/1               |
| 3                           | Tugu Mulyo           | -                 | 1                       | -     | 2/1               |
| 4                           | Cahya Tani           | -                 | 2                       | 3     | -/12              |
| 5                           | Cahya Maju           | -                 | -                       | -     | -/1               |
| 6                           | Tebing Suluh         | -                 | -                       | -     | -/1               |
| 7                           | Sindang Sari         | -                 | -                       | -     | -/1               |
| 8                           | Sumber Agung         | -                 | -                       | 1     | -/1               |
| 9                           | Tugu Agung           | -                 | -                       | -     | -/1               |
| 10                          | Kepahyang            | -                 | -                       | 1     | -/2               |
| 11                          | Tugu Jaya            | -                 | 1                       | -     | 2/1               |
| 12                          | Mekar Jaya           | -                 | -                       | -     | -/1               |
| <b>II. Lempuing Jaya</b>    |                      |                   |                         |       |                   |
| 13                          | Lubuk Siberuk        | -                 | -                       | 1     | ½                 |
| 14                          | Lubuk Mamur          | -                 | -                       | 1     | 1/1               |
| 15                          | Sungai Belida        | -                 | -                       | 1     | -/1               |
| <b>III Semendawai Timur</b> |                      |                   |                         |       |                   |
| 16                          | Karang Anyar         | -                 | -                       | 1     | -/1               |
| 17                          | Karang Mulya         | -                 | -                       | 1     | -/1               |
| 18                          | Tulung Harapan       | -                 | -                       | 1     | -/1               |
| 19                          | Harapan Jaya         | -                 | -                       | 1     | -/1               |
| 20                          | Wanasari             | -                 | -                       | 1     | -/1               |

Source : Lempuing, Lempuing Jaya and Semendawai Timur Sub-districts in Numbers, 2009/2010

Health facility distribution was relatively limited. For instance, there were respectively 1 unit of state hospital and private hospital, 22 units of health community center, 61 unit of Pustu, 5 units of Medicinal Treatment Center, 6 units of Child Birth House and 543 unit of Integrated Service Center or Posyandu (the second biggest number

following Palembang City). Health facility provision and even distribution of medical power should be taken into account because disease pattern in the future will be more complex.

### **3.3.7. Community Perception**

Perception is assessment or subjective point of view from community toward the occurrence or activity. Perception can be used to determine the magnitude of community response toward activity plan either directly related to their interest or not. Community perception toward Lempuing Irrigation Development was generally positive. This positive perception was due to relatively significant change toward economic activity of community after canal development in term of paddy field irrigation.

Community expect to receive land compensation according to the agreement and their manpower are used in this project activity plan. Land and growing plant compensations should be appropriate and given directly to land owners as an effort to prevent the price prejudice as well as overlapping of land ownership.

Information as follows was obtained from interview with community members at activity location (Table 3.22) :

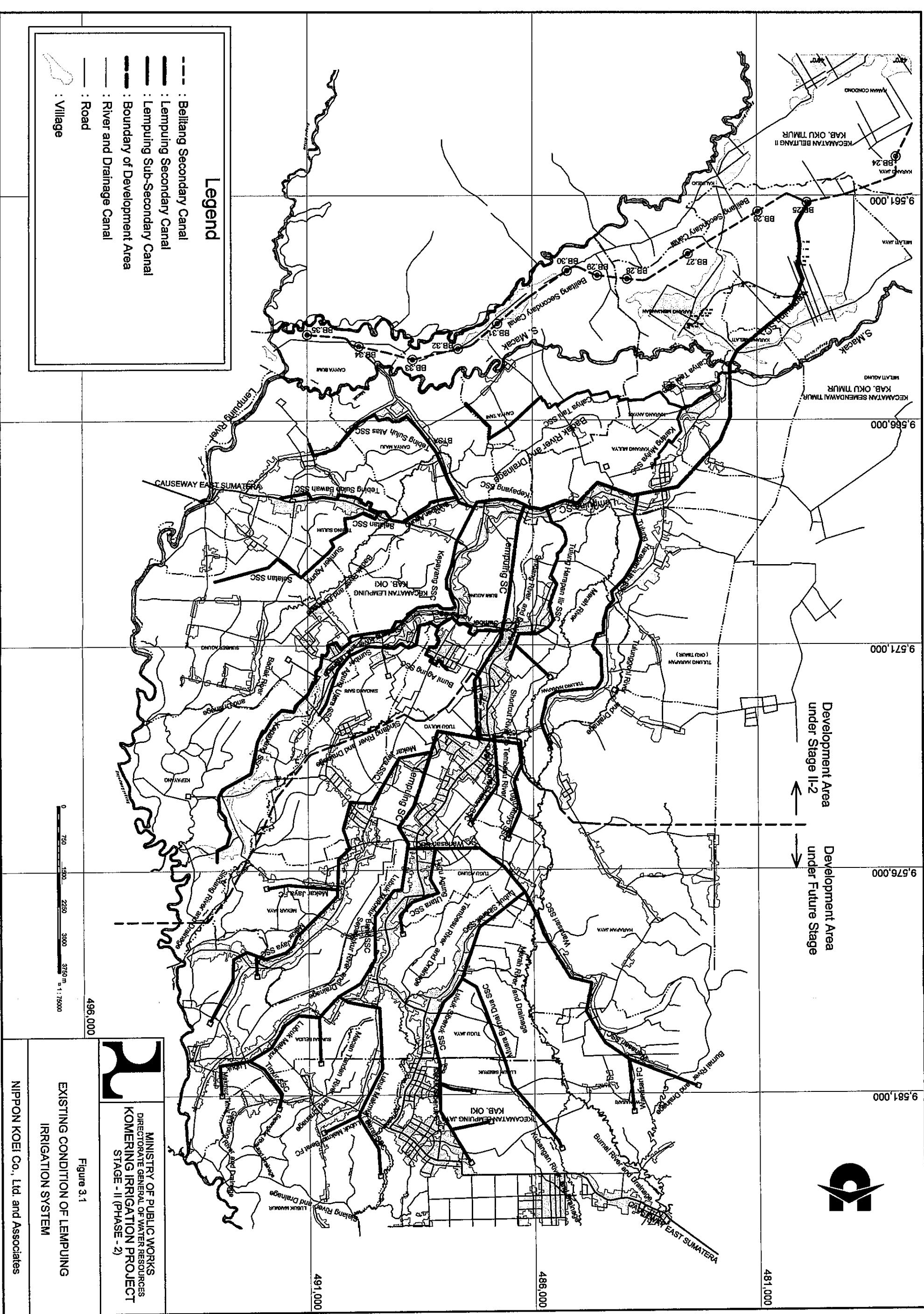
1. Most community members was not acknowledge about irrigation development activity plan in their area. Some of community members had already known about the project since some years ago, but this project will be developed just nowadays.
2. Community members in general are agree to this activity and their agricultural land such as farmyard or dry land can be used for part of this activity if the compensation is appropriate and realistic. They only remind that the land which had been cultivated since long time ago was their own although some of them have not yet have land letter or land certificate.
3. Community members hope and want that land compensation should be based on agreed upon price and also considering the growing plants above the land especially rubber plant and others. Land price should be standard in order to prevent the conflict.
4. Community members hope the manpower recruitment should give priority to manpower from their villages in the surrounding project because manpower with

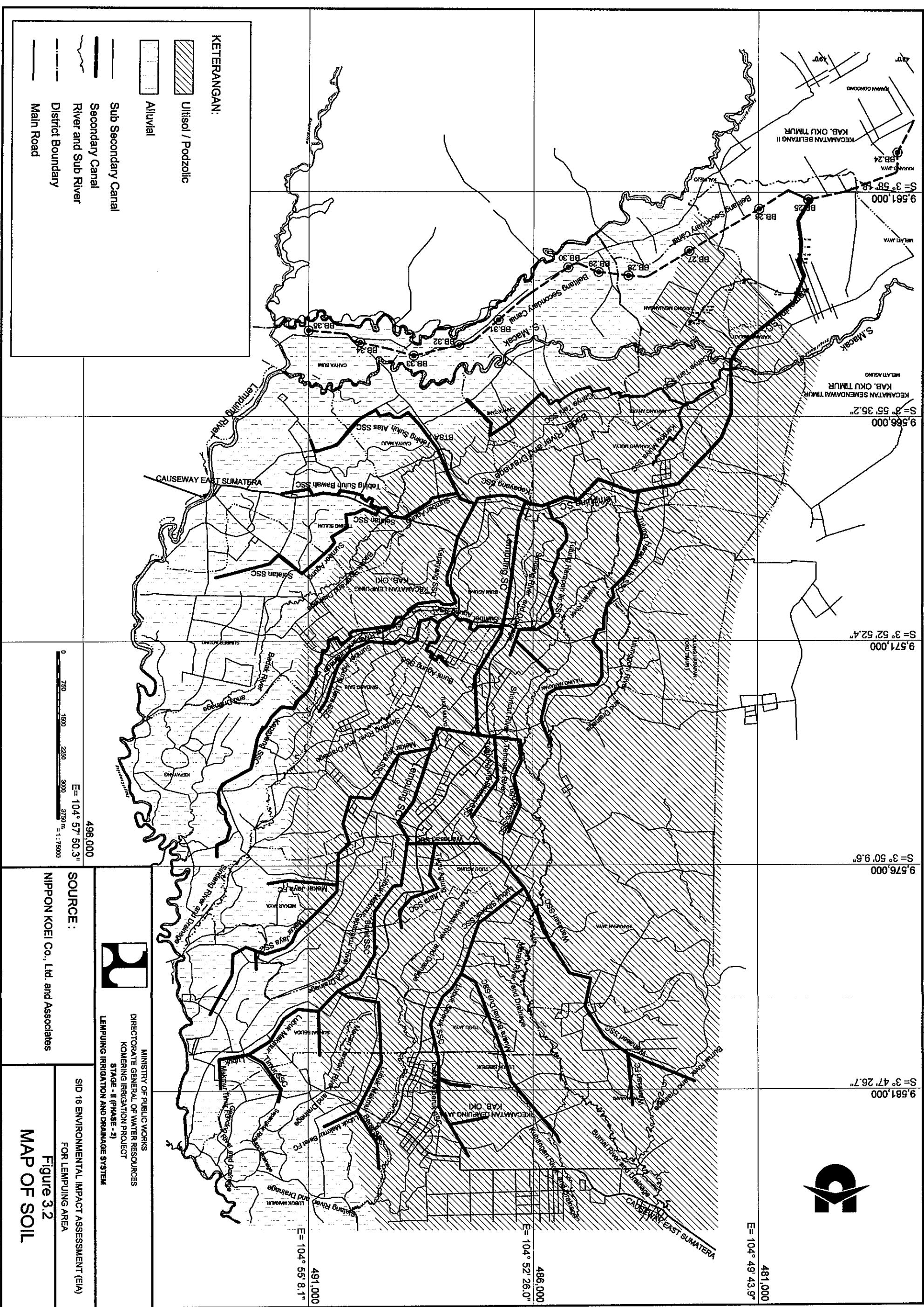
educational qualification of Junior High School or Senior High School Graduates were available in relatively significant numbers in this area. The wage should be higher than Regional Minimum Wage (UMR) because this UMR is insufficient to fulfill their basic needs. There was a trend that minimum daily wage at study plan location was Rp. 60,000, which was higher than UMR.

5. Village government and community members expect the project aid for village roads hardening at some areas because these roads are used for community members mobility and transportation.
6. Community members also expect the social aid either for public interest such as mosque or for community empowerment activity such as improvement of community economy or business activity, including business in agriculture and fish farming.

Table 3.22. Sampling Location of Socioeconomic-Culture-Community Health /Community Perception

| No | Villages         | Coordinate                     |
|----|------------------|--------------------------------|
| 1  | Karang melati.   | S=03°56'16.2" – E=104°49'38.5" |
| 2  | Karang anyar.    | S=03°55'48" – E=104°50'44.2"   |
| 3  | Cahaya tani.     | S=03°55'51.9" – E=104°52'19.8" |
| 4  | Cahaya maju .    | S=03°55'39.6" – E=104°53'43.3" |
| 5  | Tebing suluh     | S=03°54'32.9" – E=104°54'46.6" |
| 6  | Bumi agung       | S=03°54'9.6" – E=104°52'52.5"  |
| 7  | Tulung harapan . | S=03°52'37.2" – E=104°50'39.9" |
| 8  | Tugu mulyo       | S=03°52'4.7" – E=104°52'57.1"  |
| 9  | Sumber Agung     | S=03°49'54.8" – E=104°55'14.1" |
| 10 | Tugu agung .     | S=03°50'29.4" – E=104°52'53.4" |
| 11 | Harapan jaya .   | S=03°49'28.1" – E=104°51'38.2" |
| 12 | Sungai belida    | S=03°47'54.5" – E=104°55'42.0" |
| 13 | Lubuk Siberuk    | S=03°48'17.2" – E=104°53'9.8"  |
| 14 | Lubuk Makmur     | S=03°47'25.4" – E=104°53'53.9" |
| 15 | Bumi agung       | S=03°53'10,6" – E=104°53'5.9"  |
| 16 | Sindang Sari     | S=03°52'43.9" – E=104°54'15.4" |
| 17 | Kepayang         | S=03°51'15.6" – E=104°55'49.2" |





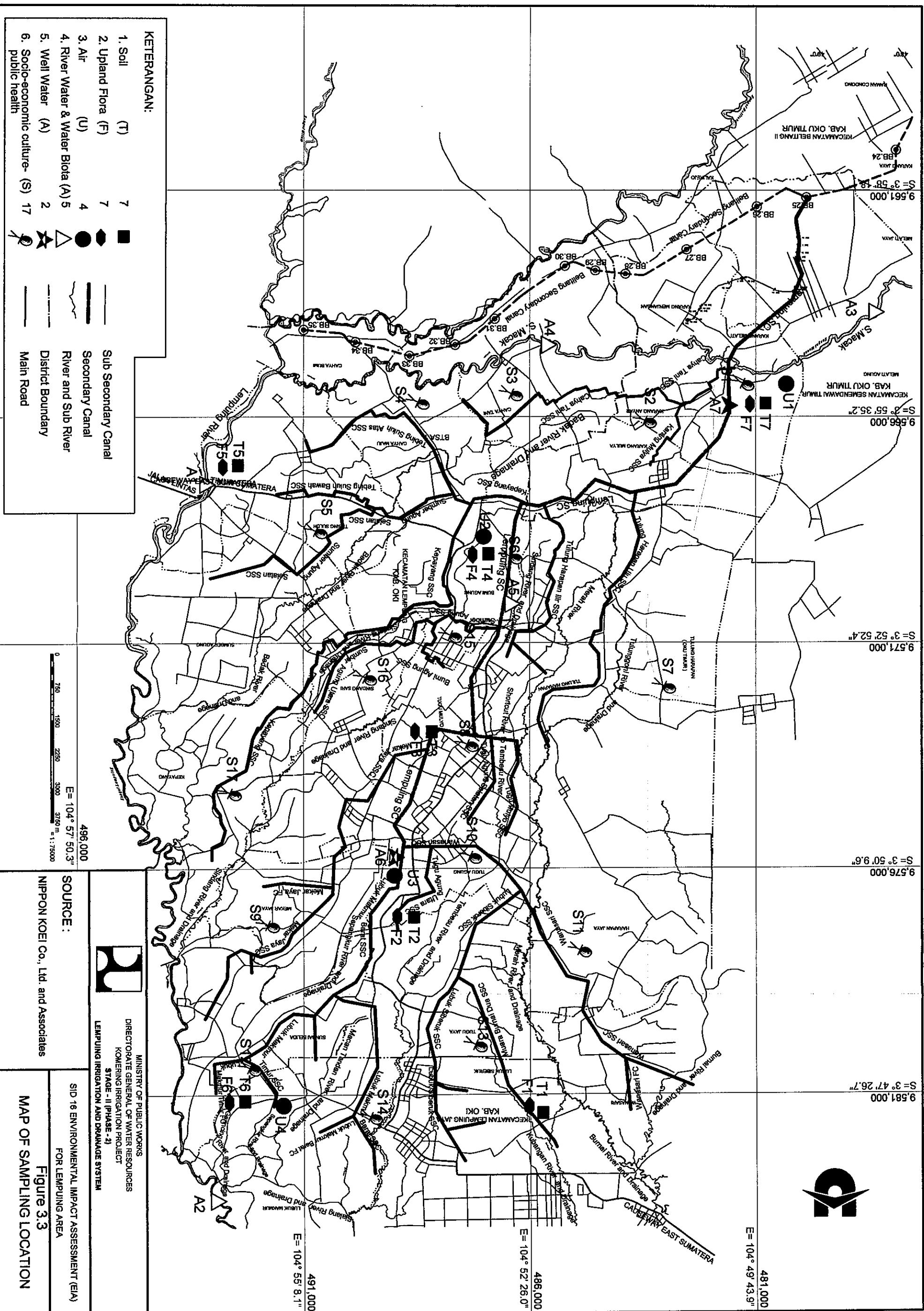


Figure 3.3

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**CHAPTER IV**  
**STUDY COVERAGE**

# **CHAPTER IV**

## **SCOPE OF THE STUDY**

### **4.1. The Studied Important Impact**

Aspects of activity impact to be studied at study area are as follows :

- 1) Activity that has potential to produce important impact is the one which facilitate on the occurrence of environmental change.
- 2) Activity that has high risk. These activities are not or not yet produce potential impact during study implementation, but it has high risk to become important impact.
- 3) Other activity which is generally has potential on environmental change.

The studied aspects can be determined based on the above criteria which consisted of pre-construction, construction, operation and post operation activities.

#### **4.1.1. Pre Construction Stage**

Activities that can produce potential impact at pre construction stage of secondary and sub-secondary canals development are as follow :

##### **4.1.1.1. Social Service/Socialization**

Social service/socialization activity related to activity plan of Lempuing irrigation development to community members and formal or informal key persons will give impact on community members. Impact of this activity is negative perception from community, especially related to land acquisition/land compensation affected by canal. However, community members that are not affected by land acquisition / land compensation will have positive perception in supporting this activity because they know this activity will give prosperity to their life.

##### **4.1.1.2. Survey, Investigation and Design**

Survey and investigation activities related to activity plan will attract the community attention in the surrounding area. The impact from this activity is negative perception from community members, especially in term of land acquisition and compensation as well the worry of losing their settlement, plants and business areas.

#### **4.1.1.3. Land Acquisition/Land Compensation Affected by Canal**

Land acquisition activity was conducted at irrigation canal and inspection road areas. Land acquisition and construction activity will produce impact as follows :

- (a) The negative perception from community will produce social conflict between initiator/government party with community members or amongst community members. Land acquisition activity will produce important negative impact on community perception, especially for land and building owners if land and building acquisition process is conducted without agreement between government and community members which results in social unrest and conflict. There is possibility of double ownership by community members during land identification ownership as well as the involvement of third party that will seek the benefit from activity implementation.
- (b) Land and building compensation will be followed by price increase for land. This is in line with economic law which state that land price will increase if the demand for land is also increase.

#### **4.1.2. Construction Stage**

##### **4.1.2.1. Construction Manpower Recruitment**

Manpower recruitment activity will be conducted by contractor in relatively high numbers so that much manpower will come from outside area of activity location. This in turn will give impact on the following matters :

- (a) The openness of job opportunity and business at the surrounding area.
- (b) Increasing of economic activity for local community members especially in fulfilling consumption and accommodation needs for manpower. Community member's perception toward activity plan will be positive if land acquisition and manpower recruitment processes are conducted in proper manner.

##### **4.1.2.2. Equipment and Materials Mobilization**

The mobilized equipments and materials were consisted of bulldozer, road grader, dump truck, excavator, jeep and motor vehicles as well as construction materials (such as sand, cement, gravel, filling soil and steel bars). Activity of equipments and material

mobilization into activity location will give impact to the environmental components as follows :

- (a) Decreasing ambient air quality and increasing noise due to exhaust gas emission and dust as well as sound from vehicles which in turn will give impact on other environmental components.
- (b) Occurrence of traffic jam and road damage that can increase the accident risk.
- (c) Negative perception from community and social unrest. The negative impact of community perception will occur toward community members who live along the road that is passed by vehicles carrying project equipments. This activity will increase the road damage, traffic jam and disturbance of community environment.

#### **4.1.2.3. Irrigation Canal Development**

Activities of irrigation canal development are consisted of land clearing, embankment development, bridges and inspection road. These activities have potential to give impact on the following matters :

- a) Decreasing air quality due to dust from soil, exhaust gas emission and dust that will be exposed into the surrounding atmosphere during operation of heavy equipments.
- b) Increasing noise and vibration due to the sound from heavy equipment during operation. Noise produce unpleasant feeling toward the surrounding community members and vibration from heavy equipment can result in damage on buildings and electronic devices at surrounding community houses.
- c) Increasing run off due to vegetation losses in the surrounding of activity location. Development of inspection road and drainage canal can also increase the run off coefficient.
- d) Decreasing river water quality at surrounding of activity location during construction activity due to sedimentation of soil particles and mud in water body.
- e) Disturbance on water quality will produce further impact in form of decreasing aquatic biota life that had potential impact on plankton, benthos and nekton (especially fishes) due to disturbance of photosynthesis in water.
- f) Disturbance toward community health, especially for community members who used to utilize water body in the surrounding location to fulfill their daily needs. This will produce negative impact toward community perception.

#### **4.1.3. Operational Stage**

##### **4.1.3.1. Construction Manpower Disengagement**

Manpower used in Lempuing irrigation development activity is recruited by the contractor and have contract agreement with contractor. After the job with contractor is finish, then job relationship is also finish. Activity of manpower disengagement had relatively low potential to produce negative impact on job opportunity and business opportunity for the surrounding community members because they had already have job previously before the project implementation.

##### **4.1.3.2. Operation and Maintenance of Canal/Irrigation Facility**

Clean canal and availability of inspection road that can be accessed by motor vehicles will have potential to be visited or passed by people and vehicles. This condition will have potential for economic activity in the surrounding location. In addition, paddy field activity that use fertilizer and pesticides has potential to produce negative impact on decreasing water quality because of these materials dissolving which results in decreasing biota quality and community health. Therefore, canal maintenance activity in long term will have important positive impact toward water biota quality, job opportunity, business opportunity, economic, health and community perception.

##### **4.1.3.3. Optimum Utilization of Irrigation Water**

The estimated negative impact at this stage was decreasing of water quality due to fertilizers and pesticides used by farmers in paddy field rice cultivation. Other aspect was the community perception related to lack of farmer knowledge in optimum utilization of water to irrigate their paddy field land. The community culture that is not used to irrigation water at initial stage of water utilization is constraint, whereas rules of conduct are not acknowledged by farmers. Although the agreement related to optimum water utilization pattern had already exist, potential for deviation of water utilization will frequently occur so that farmers who have paddy field in downstream side will not have opportunity to receive the optimum irrigation water. This in turn will produce jealousy between one farmers group to another farmers group who receive advantage in relation to optimum irrigation water for their paddy field land.

#### **4.1.4. Post Operational Stage**

##### **4.1.4.1. Canal and Irrigation Facility Management**

Demolition activity will produce impact on job opportunity for manpower at villages in the surrounding of activity location because manpower needed for this activity implementation is generally unskilled manpower. Demobilization activity of project equipments at post operational stage will produce impact on the surrounding environment. The environmental condition that will receive impact is consisted of air quality, noise and community perception.

##### **4.1.4.2. Manpower Management**

Manpower management will produce impact on capability level of workers in fulfilling their life necessity as well as effort condition of services and consumption items provided by community members in the surrounding activity of canal and irrigation facilities management.

### **4.2. The Studied Environmental Components**

#### **4.2.1. Physico-Chemical Environment**

Not all existing environmental components will be studied by using in depth analysis. Study will only be done toward environmental components that have significant change and will produce impact on other environmental components.

##### **4.2.1.1. Climate**

The observed climate parameters are consisted of rainfall, rain day, climate type, temperature, solar radiation, relative humidity as well as wind direction and velocity.

##### **4.2.1.2. Air Quality and Noise**

The observed air quality parameters are consisted of NOx content, SOx content, CO content, Ammonium content, dust, noise level and air pollutant distribution pattern.

##### **4.2.1.3. Water Quality and Hydrology**

The observed parameters are consisted of river water quality and quantity. Water quality is consisted of physical quality and chemical quality, especially parameters of temperature, BOD, COD, DO, TSS, Sulphate, Nitrate, Nitrite, Oil, Lipid, Free Ammonium,

Phosphate and organic chemistry. Water quantity is primarily related to river water discharge fluctuation available in study location.

#### **4.2.1.4. Space, Soil and Land**

The observed parameters are consisted of soil type, soil fertility in form of soil physical and chemical characteristics, soil erosion and soil conservation system. The studied parameters for soil fertility is done by using soil pH, organic matter content, macro nutrients, CEC, base saturation, Phosphorous content and others. Soil physical properties are consisted of permeability, density, water content, texture, structure and soil color. Soil coverage aspect is consisted of cover plant.

#### **4.2.2. Biological Environment**

##### **4.2.2.1. Inland Flora and Fauna**

Flora: *Natural Vegetation.* The observed parameters are consisted of type diversity, type dominance and vegetation structure. The study is also related to specific type or protected type. *Cultivated Vegetation.* The observed parameters are consisted of type diversity and benefit for the community.

Fauna. The observed fauna is consisted of mammalia, reptile, amphibi and aves found at study area. The observed parameters are type diversity, type and habitat condition.

##### **4.2.2.2. Waters Biota**

*Plankton and Benthos;* The observed parameters are consisted of type numbers, abundance and type diversity.

*Nekton (Fish);* the observed parameters are consisted of type numbers, type having economic value and protected type.

#### **4.2.3. Social, Economic, Cultural and Health Environment**

Environmental aspects of social, economic, cultural and health are estimated will be change or will create problem due to the activity. The problem can arise due to the change in social, economic and health aspects as further impact from environmental change.

General indicators of social, economic, cultural and health are consisted of :

- 1). Income indicator as a results of change in job opportunity and business opportunity.
- 2). Indicator and parameter of social, economic and cultural that are related to outside culture and incoming inhabitants.
- 3). Indicator and parameter of social unrest in term of related activity.
- 4). Indicator of disease intensity and prevalence related to activity plan.
- 5). Environmental sanitation.
- 6). Types and numbers of health facility.

Identification results and impact priority in detail can be described in matrix table and impact flowchart below.

Table 4.1. Identification Matrix of Activity Impact of Irrigation Development at Lempuing Area.

| No   | Environmental Components                 | Activity Stages  |   |   |              |   |   |             |   |   |                  |    |
|--|--|------------------|---|---|--------------|---|---|-------------|---|---|------------------|----|
|  |  | Pre-Construction |   |   | Construction |   |   | Operational |   |   | Post Operational |    |
|  |  | 1                | 2 | 3 | 4            | 5 | 6 | 7           | 8 | 9 | 10               | 11 |
| <b>A. Physical-Chemical Component</b>                                |  |                  |   |   |              |   |   |             |   |   |                  |    |
| 1  | Air Quality                              |                  |   |   | X            | X |   |             |   |   |                  | X  |
| 2  | Noise and Vibration                      |                  |   |   | X            | X |   |             |   |   |                  | X  |
| 3  | Water Quality                            |                  |   |   |              | X |   |             | X | X |                  |    |
| 4  | Hydrology                                |                  |   |   |              | X |   |             |   |   |                  |    |
| 5  | Space, Land and Soil                     |                  |   |   |              |   | X |             |   |   |                  |    |
| <b>B. Biological Component</b>                                       |  |                  |   |   |              |   |   |             |   |   |                  |    |
| 1  | Inland Flora and Fauna                   |                  |   |   |              |   | X |             |   |   |                  |    |
| 2  | Water Biota                              |                  |   |   |              |   | X |             | X | X |                  |    |
| <b>C. Social, Economic, Cultural and Community Health Components</b> |  |                  |   |   |              |   |   |             |   |   |                  |    |
| 1  | Job Opportunity and Business Opportunity |                  |   |   | X            | X | X | X           | X | X |                  | X  |
| 2  | Economic                                 |                  |   |   | X            | X |   |             | X | X |                  |    |
| 3  | Traffic Jam and Road Damage              |                  |   |   |              | X |   |             |   |   |                  |    |
| 4  | Community Health                         |                  |   |   |              |   | X |             | X | X |                  |    |
| 5  | Community Perception                     | X                | X | X | X            | X | X | X           | X | X | X                | X  |

Remarks :

- 1. Social Service/Socialization
- 2. Survey, investigation and design
- 3. Land Acquisition/Land Compensation
- 4. Construction Manpower Recruitment Mobilization and Demobilization of Equipments and Materials
- 5. Construction Works for Irrigation Facilities
- 6. Construction Manpower Disengagement
- 7. Operation and Maintenance of Canals/Irrigation Facilities
- 8. Optimum Use of Irrigation Water
- 9. Canal and Irrigation Facility Management
- 10. Manpower Management

X : Interaction

- : No interaction

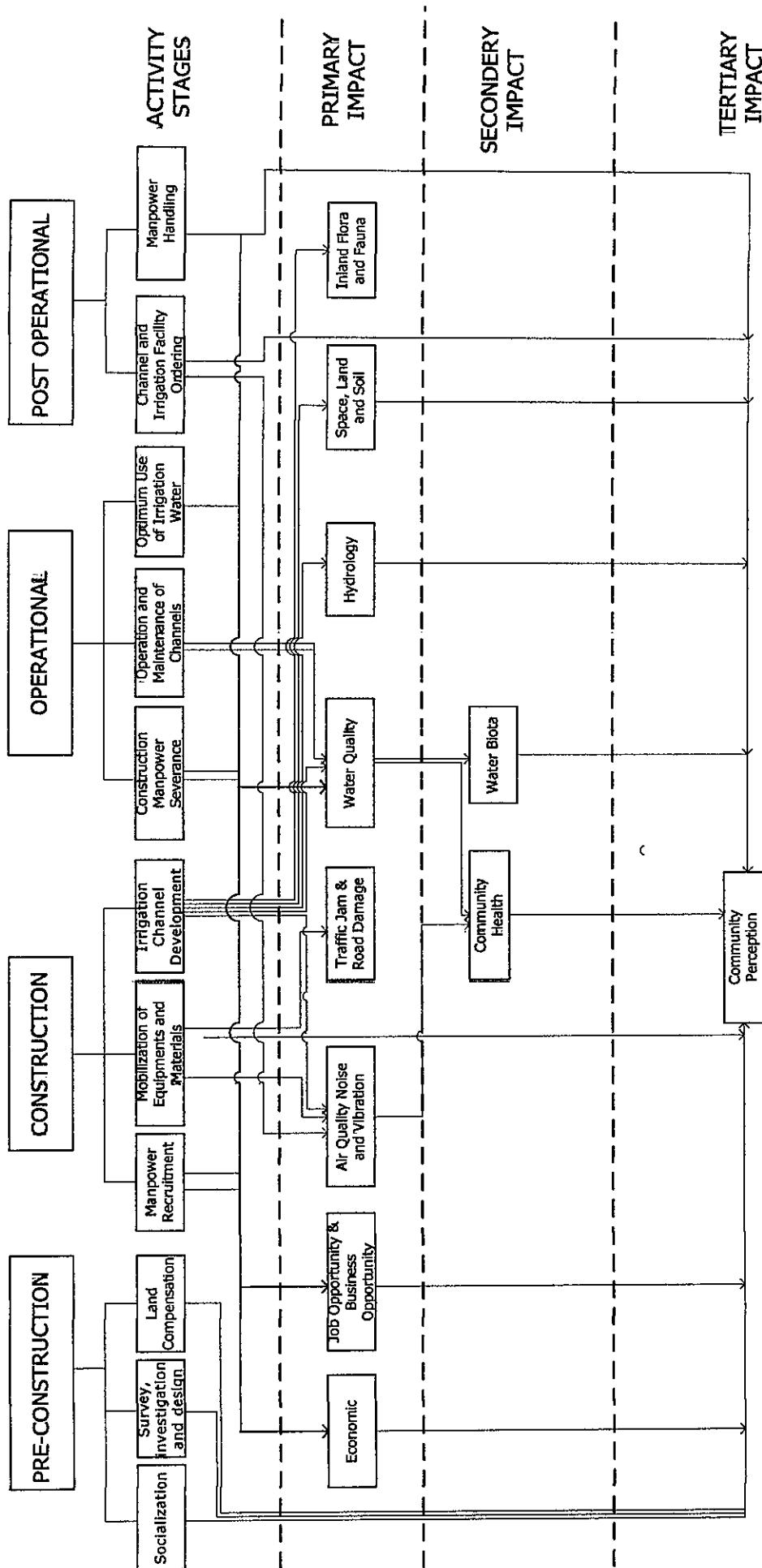
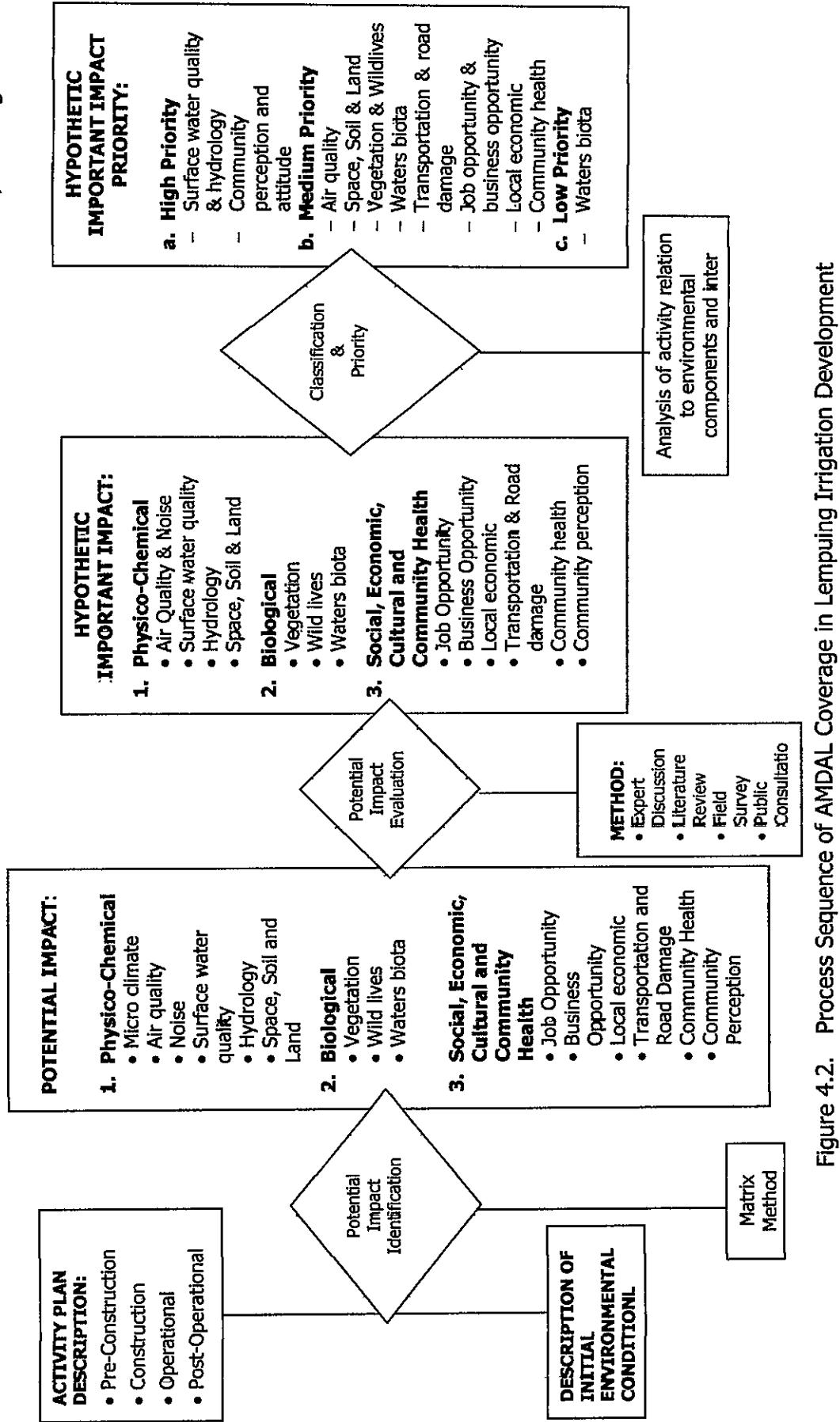


Figure 4.1 Flowchart Impact in Irrigation Development at Lempuing Area

BALAI BESAR WILAYAH SUNGAI SUMATERA VIII  
ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUIJNG AREA (13,500 HA)



BALAI BESAR WILAYAH SUNGAI SUMATERA VIII

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUIJING AREA (13,500 HA)

Figure 4.2. Process Sequence of AMDAL Coverage in Lempuing Irrigation Development

### **4.3. Study Area and Study Time Period**

#### **4.3.1. Project Border**

Project border is consisted of plan location site of Lempuing irrigation canal development. Project border determination is based on location that will be used by initiator to conduct development activity of secondary and sub-secondary canals.

#### **4.3.2. Ecological Border**

Ecological border is impact distribution space from activity plan of Lempuing Irrigation Canal development in which on-going natural process within this space is estimated to experience significant change, including the surrounding space that will give impact on operational activity of irrigation canal. Ecological border in this study is determined according to its existence in river flow (Watershed/Subwatershed) of Lempuing and Komering rivers.

#### **4.3.3. Social Border**

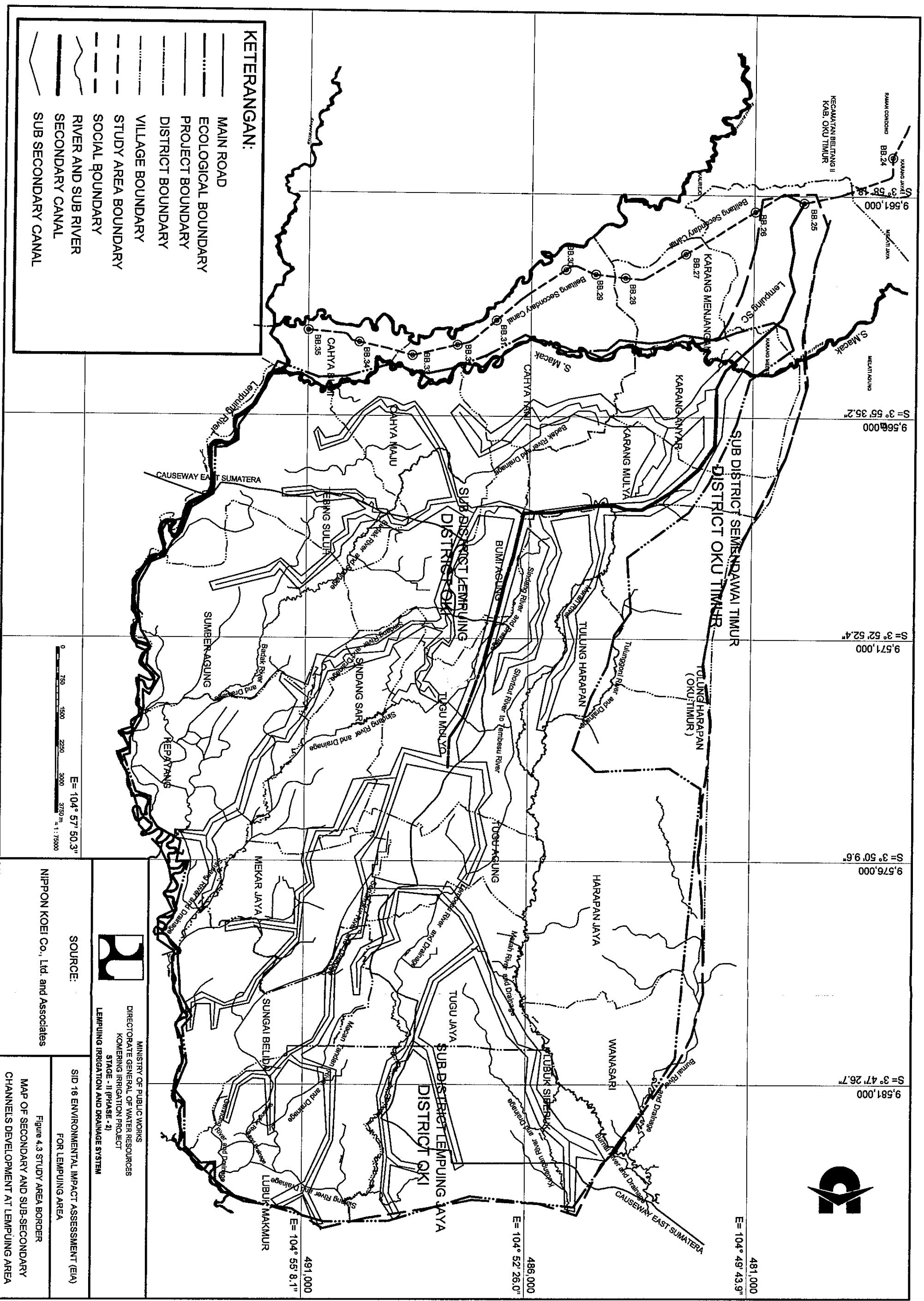
Social border that probably affected by impact was consisted of 4 Villages at Semendawai Timur Subdistrict in OKU Timur District, 3 Villages at Lempuing Jaya Subdistrict and 12 Villages at Lempuing Subdistrict in OKI District.

#### **4.3.4. Administrative Border**

Administrative border for activity of Lempuing Irrigation Canal Development was consisted of 4 Villages at Semendawai Timur Subdistrict in OKU Timur District, 3 Villages at Lempuing Jaya Subdistrict and 12 Villages at Lempuing Subdistrict in OKI District.

#### **4.3.5. Time Period of Study**

Time period of study which capable to identify and evaluate environmental impact based on estimation of development in the future and technical limitation of this study is decided for 25 years since initial activity. Determination of time period of study is based on consideration that environmental condition or activity in the future probably will change which made current environmental impact assessment is not relevant.



ENVIRONMENTAL IMPACT ASSESSMENT  
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**CHAPTER V**  
**IMPORTANT IMPACT ESTIMATION**

# **CHAPTER V**

## **Important Impact Estimation**

Impact magnitude estimation is done toward impacts from the plan and/or activity by using formal approach such as mathematical model and non-formal approach such as analogy method, expert opinion and comparison with environmental quality standard. Estimation of impact importance is refers to Indonesia Republic Government Regulation No.27/1999 related to Environmental Impact Assessment (ANDAL) and Decree Letter from Head of Environmental Impact Control Council (BAPEDAL) No.Kep.056/1994 related to Guideline of Important Impact Magnitude. Important impact estimation in this ANDAL study will be conducted toward hypothetic important impacts from coverage results which are stated in agreed upon Contract Agreement of Environmental Impact Assessment (KA-ANDAL). Process and results from impact estimation of efforts and/or activity at pre-construction, construction, operational and post operational stages are described as follows.

### **5.1. Pre-Construction Stage**

#### **5.1.1. Social Service/Socialization**

Socialization activity will give impact on various perceptions from community members resulting in social unrest, especially which related to land and building acquisition as well as decrease of environmental quality. This impact is classified as negative important impact, especially if either formal or non formal community key persons cannot give definite direction and information. On the other hand, it will give important positive impact if community members support the activity due to awareness of improvement in environment and their life.

From impact importance point of view:

- 1) Number of people affected by the impact due to socialization activity implementation was high because of extensive coverage area.
- 2) Contribution from socialization activity made the area that experience significant change (for example the change of community welfare) due to socialization impact is relatively high because this activity will made the area becoming more developed.

- 3) The period of on-going impact is only temporary and impact intensity is low at pre-construction stage.
- 4) Number of environmental components affected by impact is classified as important because secondary impact from socialization activity is the community perception.
- 5) Environmental impact is not fluctuating or relatively constant because it happened one time during implementation of socialization activity and no further impact after the finishing of this activity.
- 6) Environmental impact is irreversible because some cleared area had been changed and cannot be maintained similar to its initial condition.

### **5.1.2. Survey, Investigation and Design**

This activity has potential to produce social unrest, especially for community members affected by activity. This impact is classified as important because the probability of substitution price increases rejection and the third party emergence as scalper so that it is classified as important negative impact on the project. On the other hand, it is classified as important positive impact on community perception if community members are eager to support this activity.

From impact importance point of view:

- 1) Number of people affected by the impact due to survey and investigation activities implementation is high because of extensive coverage area.
- 2) Contribution magnitude of survey and investigation activities made the area that experience significant change (for example the change of community welfare) due to socialization impact is high because this activity will make the area becoming more developed.
- 3) The period of on-going impact is only temporary and impact intensity is classified as low at pre-construction stage.
- 4) Number of environmental components affected by impact is classified as important because impact from survey and investigation activities is the community perception.
- 5) Environmental impact is not fluctuating or relatively constant because it happened one time during implementation of survey, investigation and design activities.
- 6) Environmental impact is irreversible because some cleared area had been changed and cannot be maintained similar to its initial condition.

### **5.1.3. Land Acquisition/Land Compensation Affected by Canal**

Land acquisition activity at project plan will be conducted at pre-construction stage. Activity in this stage will produce important negative impact, especially for components of sociocultural and economic of community. Land acquisition had potential to produce negative impact in the form of unrest and jealousy from land owner affected by project as well as the emergence of scalper. Therefore, this activity should be managed as proper as possible in order to prevent significant obstacle for subsequent activity at operational stage.

From impact importance point of view :

- 1) Number of people affected by the impact due to activities implementation is high because of extensive coverage area.
- 2) Contribution magnitude of activities made the area that experience significant change (for example the change of community welfare) is high.
- 3) The period of on-going impact is only temporary and impact intensity is classified as low because this impact is only happened during pre-construction stage.
- 4) Number of environmental components affected by impact is classified as important because impact from activities is the community perception.
- 5) Environmental impact is not fluctuating because it happened one time during implementation of activity.
- 6) Environmental impact is irreversible because some cleared area had been changed and cannot be maintained similar to its initial condition.

## **5.2. Construction Stage**

### **5.2.1. Construction Manpower Recruitment**

#### **5.2.1.1. Job Opportunity and Business Opportunity**

Manpower recruitment for construction activity is consisted of unskilled manpower either from location in the nearby of development activity or from outside area. This has impact on the openness of job opportunity for community members at activity location. This condition will give sufficient contribution in solution effort of unemployment problem available in this area. By working at this construction activity, manpower from the community can increase their capability to fulfill the life need or requirement.

From the relationship between job opportunity specification and population composition based on job at this location, working opportunity impact for local job seekers is classified as high compared to the previous condition. Moreover, they will receive acknowledgement and support from all community members in their environment due to contribution in increasing the community welfare. Therefore, this impact is classified as important positive impact.

From impact importance point of view :

- 1) Number of recruited manpower that enjoy positive impact is classified as high because almost all job opportunity available for construction can be filled by local job seekers due to their ability and skill as well experience in the previous jobs.
- 2) Coverage area that experience significant change (decrease in unemployment level) as a results of manpower recruitment activity is classified as high in relation to high number of recruited workers.
- 3) The period of on-going impact is only at construction stage so that this impact is not important or has temporary impact.
- 4) Number of environmental components affected by impact is classified as important because the job opportunity has impact on the increase employment opportunity and increase of income/welfare of manpower or workers.
- 5) Environmental impact is irreversible so that it is important because some cleared area had been changed and cannot be maintained similar to its initial condition.

#### **5.2.1.2. Economy**

The activity at construction stage is also results in economic activity development and increasing income for community members in the surrounding area. This was occurred due to the availability of workers need for consumption and settlement so that it becomes livelihood source or new income. This impact is classified as important because :

- 1) Number of recruited manpower that enjoy positive impact is classified as high because almost all job opportunity available for construction can be filled by workers from outside areas due to their ability and skill as well experience in the previous jobs.
- 2) Coverage area that experience significant change (increase of economy level) as a result of manpower recruitment activity is classified as because availability of job that in turn will increase the economy level for this area.

- 3) The period of on-going impact is only at construction stage so that this impact is not important and impact intensity is classified as low and not important.
- 4) Number of environmental components affected by impact is classified as high because the job opportunity has impact on the economic growth of area development and increase of income/welfare.
- 5) Environmental impact is not cumulative because it happened one time during implementation of activity at construction stage.
- 6) Environmental impact is irreversible so that it is important because some cleared area had been changed and cannot be maintained similar to its initial condition.

#### **5.2.1.3. Community Perception**

This activity will also produce negative perception from community if number of outside workers is higher than workers from community members in the surrounding activity location. This impact is classified as important negative impact because it can produce unrest at community members and causing conflict with initiator party which in turn will disturb activity implementation if this activity is not in accordance to current community aspiration. On the other hand, this activity will produce important positive impact if community supports this activity due to the increase of welfare. Number of recruited manpower that enjoy positive impact is classified as high because almost all job opportunity available for construction can be filled by local work seekers.

#### **5.2.2. Equipments and Materials Mobilization**

##### **5.2.2.1. Air Quality, Noise and Vibration**

Activity of equipments and materials mobilization can produce impact toward decreasing air quality along the road that is cross by vehicles due to exhaust gas emission and dust, noise and vibration which results in the community health disorder. This impact is classified as important negative impact because :

- 1) Number of people affected by impact of decreasing air quality is classified as important because most of community members which receive negative impact of decreasing air quality live in the nearby of road which is cross by vehicles, especially non-asphalt road found in the surrounding of activity location.

- 2) Coverage area that experience significant change is classified as small compared to activity area as a study border so that this impact is classified as not important.
- 3) The impact intensity is relatively low with magnitude of 3 to 5 trucks per day and impact period is long during construction stage. Increase of noise will disturb the pleasure of community members due to vehicles sound that carry equipments.
- 4) Number of environmental components affected by important impact due to decreasing air quality will produce secondary impact such as health disorder and negative perception from community in the surrounding of project location.
- 5) Environmental impact is cumulative because impact of decreasing air quality will be combined with impact from vehicles that cross main road into project location resulting in cumulative impact.
- 6) Environmental impact is irreversible so that it is important because some cleared area had been changed and cannot be maintained similar to its initial condition.

#### **5.2.2.2. Job Opportunity and Business Opportunity**

Manpower recruitment for construction activity is consisted of unskilled manpower either from location in the nearby of development activity or from outside area. This has impact on the openness of job opportunity for community members at activity location. This condition will give sufficient contribution in solution effort of unemployment problem available in this area. By working at this construction activity, manpower from the community can increase their capability to fulfill the life need or requirement.

#### **5.2.2.3. Economy**

Activity of equipments and materials mobilization that needs manpower recruitment is also produce economic increase due to the existence of construction materials and equipments provision by suppliers either in the surrounding of activity location or outside activity location.

From impact importance point of view :

- 1) Number of people that enjoy positive impact is classified as high because many job opportunity and business opportunity available for construction material suppliers can be filled by local job seekers and local suppliers which in turn will increase the area economy growth.

- 2) Coverage area that experience significant change (decrease in unemployment level and increase in business opportunity) as a result of activity of workers recruitment is classified as high.
- 3) The period of on-going impact is only at construction stage so that this impact is not important and impact intensity is classified as low and not important.
- 4) Number of environmental components affected by impact is classified as high and the job opportunity, better life environment and economic growth in this area have impact on increase of income/welfare.
- 5) Environmental impact is cumulative which results in economic development in this area.
- 6) Environmental impact is reversible so that it is important because it can produce economic development in this area.

#### **5.2.2.4. Traffic Jam and Road Damage**

The traffic jam and road damage is estimated to be occurred in road (outside location) or incoming road into the project location. Carrier truck mobility of construction materials might results in road damage and traffic jam because abundant material of filling soil for canal wall development should be carried by trucks through public road that is usually used by the community members as transportation facility.

From potential impact and impact importance level point of view, then this impact is classified as important negative impact because numbers of people affected by negative impact from traffic jam is higher than numbers of people that receive the benefit from development.

#### **5.2.2.5. Community Perception**

Mobilization can also produce disturbance of environmental aesthetic, especially from dust, vehicle tire debris, materials spill as well as damage and traffic jam along the transportation road. Dust and noise from mobilization activity will produce negative perception from community so that this activity has potential to produce unrest and social conflict within the community. On the other hand, this activity has also positive impact from community perception point of view because it creates job opportunity, business opportunity and better welfare or income of community members.

From impact importance point of view :

- 1) Number of people that affected by impact from activity is classified as high because it has extensive coverage area.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high.
- 3) The period of on-going impact is only at construction stage.
- 4) Number of environmental components affected by impact is classified as important because the primary impact from activity is community perception.
- 5) Environmental impact is not cumulative because it is occurred only one time during implementation activity.
- 6) Environmental impact is irreversible.

### **5.2.3. Irrigation Canal Development**

#### **5.2.3.1. Air Quality, Noise and Vibration**

This activity has potential to produce impact on the decrease of air quality due to exhaust gas emission and dust that will be exposed to surrounding air, especially at location of dense community settlement area. This activity is also produce increase of noise and vibration from the sound of heavy equipments. Therefore, this impact is classified as important negative impact.

#### **5.2.3.2. Water Quality and Hydrology**

Decreasing river water quality during construction activity is due to dissolved soil particles from equipments used in this activity and rainfall flow in the surrounding of location because irrigation canal development will bring dissolved soil particles and runoff from rainfall into the river. Decreasing river water quality results in impeding photosynthesis process in water. Aquatic biota life that might be affected by sedimentation change is plankton, benthos and nekton (especially fishes). The produced impact is classified as important negative impact.

- 1) Number of people affected by decreasing water quality impact is classified as high because water is used for community life activities.
- 2) Coverage area that experience significant change is classified as extensive because activity will be conducted along the river flow.
- 3) Impact intensity is relatively long after activity of irrigation canal development.

- 4) Number of environmental components affected by impact is classified as important because the decrease of water quality and hydrological condition will produce secondary impacts such as decreasing water biota quality, health disorder and negative perception from community in the surrounding of project location.
- 5) Environmental impact is reversible so that this impact is not important.
- 6) Environmental impact is reversible because it occurs for long time and some measures can be done to improve the water quality and hydrological condition.

#### **5.2.3.3. Space, Land and Soil**

Canal development will change the landscape and increasing run-off due to vegetation losses at surrounding of activity location. Inspection road development can increase the run-off coefficient. This activity would also encourage forest land conversion into paddy field land by the community members because of irrigation water availability. From space, land and soil point of view, the produced impact is classified as important negative impact :

- 1) Number of people affected by the impact is classified as high although impact on human is tertiary impact because decreasing water quality is due to the change in space, land and soil.
- 2) Coverage area that experience significant change is classified as extensive because activity coverage that will distribute along with river flow.
- 3) Impact intensity is relatively long starting from construction stage to the future time.
- 4) Number of environmental components affected by impact is classified as important because the change in space, land and soil will produce secondary impact such as decreasing water quality, health disorder and negative perception from community in the surrounding of project location.
- 5) Environmental impact is irreversible so that this impact is important.
- 6) Environmental impact is irreversible because space, land and soil had been changed and cannot be maintained similar to their initial condition .

#### **5.2.3.4. Inland Flora and Fauna**

Canal development will trigger the occurrence of decreasing genetic diversity of inland flora and fauna due to land clearing either for canal development or derivative

impact because it triggers land conversion into paddy field land. The produced impact is classified as important negative impact :

- 1) Number of people affected by the impact is classified as small and impact on human is tertiary impact.
- 2) Coverage area that experience significant change is classified as extensive because of activity coverage.
- 3) Impact intensity is relatively long due to irreversible change of land as habitat for inland flora and fauna.
- 4) Number of environmental components affected by impact is classified as important because the lost of inland flora can trigger dissolving of organic matter and soil particles that facilitate the decreasing of water quality and water biota quality, health disorder and negative perception from community in the surrounding of project location.
- 5) Environmental impact is irreversible so that this impact is important.
- 6) Environmental impact is irreversible because it occurs for long time as a result of change of land as habitat for inland flora and fauna.

#### **5.2.3.5. Water Biota**

Water quality disturbance will produce derivative impact in form of decreasing aquatic biota life. The aquatic biota life that has potential to be affected by this change is plankton, benthos and nekton (especially fish) due to disturbance of photosynthesis process in water. The produced impact is classified as important negative impact :

- 1) Impact distribution area. Decrease of water biota quality will extensively distributed and is carried by water flow along with decrease of water quality.
- 2) Impact period is during canal development stage.
- 3) Waters components affected by impact are relatively high consisting water biota life such as phytoplankton, zooplankton, benthos and nekton live on waters base.
- 4) Environmental impact is reversible so that this impact is not important.

#### **5.2.3.6. Community Health**

Decrease of air quality, increase of noise and dust as well as decrease of water quality in the surrounding activity location will have important negative impact on community

health in the surrounding of activity location. The considerations for these aspects are as follows :

- 1) Number of people affected by the impact due to the activity is classified as high due to extensive coverage area.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high due extensive coverage area including many people.
- 3) Impact period is during construction stage.
- 4) Number of environmental components affected by impact is classified as important because the secondary impact from activity is community perception.
- 5) Environmental impact is not cumulative because it is occurred only one time during implementation activity.
- 6) Environmental impact is irreversible.

#### **5.2.3.7. Community Perception**

Community perception either positive or negative is the results of environmental quality change at the surrounding of activity location. Potential of environmental quality change will be balanced by the increase in community welfare. Negative perception will occur if community thinks that development has higher negative effect on environmental damage than positive effect gained and vice versa. Therefore, from impact importance point of view :

- 1) Number of people affected by the impact due to the activity is classified as high because of extensive coverage area.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high.
- 3) Impact period is during construction stage.
- 4) Number of environmental components affected by impact is classified as important because they will affect the community perception.
- 5) Environmental impact is not cumulative because it is occurred only one time during implementation activity.
- 6) Environmental impact is temporary during implementation activity.

### **5.3. Operational Stage**

#### **5.3.1. Construction Manpower Disengagement**

Manpower used in this activity is recruited by the contractor. After the work with contractor is finish, then working contract between manpower and contractor is also ending. Activity of manpower disengagement has potential to produce relative small impact on income and job opportunity which subsequently produce derivative impact on community perception. Community perception will be positive if disengagement process can satisfy workers and vice versa.

##### **5.3.1.1. Job Opportunity and Business Opportunity**

Activity of manpower disengagement has potential to produce relatively small impact on income and job opportunity. Therefore, this impact is classified as important positive impact. From impact importance point of view :

- 1) Number of people that affected by impact is classified as relatively high because the loss of job opportunity available for construction that can be filled by local job seekers due to their ability and skill as well experience in the previous jobs.
- 2) Coverage area that experience significant change (increase in unemployment) as a results of manpower recruitment activity is classified as high because it consisted of high numbers of manpower.
- 3) Impact period is only during operational stage so that it is important.
- 4) Number of environmental components affected by impact is classified as important because the lost of job opportunity.
- 5) Environmental impact is irreversible so that it is not important.

##### **5.3.1.2. Community Perception**

Manpower severance activity will results in occurrence of negative perception from community if working contract severance is considered inappropriate so that it can be categorized as important negative impact. On the other hand, it will produce important positive impact if the community thinks that working contract severance is appropriate. From impact importance point of view, number of people affected by impact is classified as high and almost all job opportunity available for construction can be filled by local job seekers.

### **5.3.2. Canal Operation and Maintenance as well as Irrigation Utilization**

Canal maintenance is conducted to provide optimum flow of water quantity, minimize leakage at canal and canal walls as well to operate flow division structures. This activity has important impact on water quality and water biota as well as job opportunity.

#### **5.3.2.1. Water Quality**

Improper canal operation and maintenance as well as irrigation water utilization have potential to produce important negative impact on decreasing water quality because of dissolving of these substances. From impact importance point of view :

- 1) Number of people that affected by water quality decreasing impact is classified as high because water is used for community life activities.
- 2) Coverage area that experience significant change is classified as extensive because activity coverage that will distribute along with river flow.
- 3) Impact period is relatively long during operational stage.
- 4) Number of environmental components affected by impact is classified as important because the decrease of water quality and change of hydrological condition will produce derivative impact such as decrease of water biota quality and health disorder.

#### **5.3.2.2. Water Biota**

Decreasing waters biota quality is derivative impact from the decrease of water quality. The produced impact is classified as important negative impact :

- 1) Impact distribution area. Decrease of water biota quality will extensively distributed and is carried by water flow having low of water quality.
- 2) Impact period is relatively long starting from canal development stage to the future time.
- 3) Waters components affected by impact is relatively high consisting of water biota life such as phytoplankton, zooplankton, benthos and nekton live on waters base.
- 4) Environmental impact is reversible so that this impact is not important.

### **5.3.2.3. Job Opportunity, Business Opportunities and Economy**

Operation of irrigation facilities and canals will give important positive impact on job opportunity due to the increase rice cultivation activities and other activities as the double effect of irrigation water existence. The increase of activity on other areas are also occurred such as husbandry, fish farming, land cultivation services as well as shops for fertilizers, agricultural chemicals and livestock feed. From impact importance point of view :

- 1) Number of people that enjoy positive impact is classified as high because it is distributed at three Sub-districts where the majority of the community livelihood is as farmers.
- 2) Coverage area that experience significant change is classified as extensive covering three Sub-districts.
- 3) Impact period is relatively long during operational stage.
- 4) Number of environmental components affected by impact is classified as important because it will produce welfare level improvement through other life aspects.

### **5.3.2.5. Community Health**

Improvement of community health is due to increase of income and improvement of welfare as a result of activity in this stage. This impact is important positive impact by considering the following matters :

- 1) Number of people affected by impact due to activities is classified as high due to extensive area coverage.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high.
- 3) Impact period is during operational stage.
- 4) Number of environmental components affected by impact is classified as important because secondary impact from activity is community perception.

### **5.3.2.6. Community Perception**

The estimated negative impact that will be happened on canal operation is related to lack of knowledge from farmers in water utilization to irrigate their paddy field land in optimum manner. In addition, community culture that is not accustomed to irrigation water existence might become constraints. The community members are not accustomed

to irrigation water utilization in optimum manner. This has potential toward the deviation of water utilization so that farmers who have paddy field in downstream side will not have opportunity to receive the optimum irrigation water. This in turn will produce jealousy between one farmers group to another farmers group who receive advantage in relation to optimum irrigation water for their paddy field land. These impacts are important positive impact and important negative impact by considering the following matters :

- 1) Number of people affected by impact due to activities is classified as high due to extensive area coverage.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high.
- 3) Impact period is during operational stage.

#### **5.4. Post Operational Stage**

##### **5.4.1. Canal and Irrigation Facility Management**

Demolition activity will not give important negative impact on air quality and noise during implementation of canal and irrigation facilities management. In addition to canal and irrigation facility demolition, activity of project equipment demobilization at post operational stage such as heavy equipments and trucks will produce important negative impact on air quality and noise that affect the community perception in the surrounding activity area.

###### **5.4.1.1. Air Quality, Noise and Vibration**

This activity has potential to produce impact on the decrease of air quality due to exhaust gas emission and dust that are exposed into the surrounding air, especially at location of dense community settlement. The increase of noise and vibration due to sound from heavy equipments is also occurred. Therefore, this impact is classified as important negative impact.

###### **5.4.1.2. Community Perception**

Community perception either positive or negative is the results of environmental quality change at the surrounding of activity location related to activity of irrigation canal management due to impacts such as water quality, waters biota and access to water resource. From impact importance point of view :

- 1) Number of people affected by impact as a result of activity is classified as high because of extensive area coverage.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high.

#### **5.4.2. Manpower Management**

Manpower management will give important impact on job opportunity and business opportunity for the community as well as important impact on community perception in this activity.

##### **5.4.2.1. Job Opportunity, Business Opportunities and Economy**

Manpower management for canal management will have important positive impact on job opportunity and business opportunity.

- 1) Number of people affected by impact as a result of activity is classified as high because of extensive area coverage.
- 2) Number of environmental components affected by impact is classified as important because it will produce the increase of welfare through other life aspects.

##### **5.4.2.2. Community Perception**

Community perception either important positive or important negative is the results of manpower management activity impacts such as manpower recruitment, job opportunity, business opportunity and economic growth. From impact importance point of view :

- 1) Number of people affected by impact as a result of activity is classified as high because of extensive area coverage.
- 2) Contribution magnitude of activities made the area that experience significant change due to activity impact is classified as high.

Activity impact estimation is comprehensively presented in Table 5.1.

**Table 5.1. Matrix of Important Impact Estimation for Secondary and Sub-secondary Canal Development Activity in Lempuing Irrigation Area.**

| No   | Environmental Components       | Activity Stages  |    |    |              |    |    |             |    |    |                  |     |
|--|--------------------------------|------------------|----|----|--------------|----|----|-------------|----|----|------------------|-----|
|  |                                | Pre-Construction |    |    | Construction |    |    | Operational |    |    | Post Operational |     |
|  |                                | 1                | 2  | 3  | 4            | 5  | 6  | 7           | 8  | 9  | 10               | 11  |
| <b>A. Physico-Chemical Component</b>                                 |                                |                  |    |    |              |    |    |             |    |    |                  |     |
| 1  | Air Quality                    |                  |    |    |              | -P | -P |             |    |    |                  |     |
| 2  | Noise and Vibration            |                  |    |    |              | -P | -P |             |    |    |                  |     |
| 3  | Water Quality                  |                  |    |    |              | -P |    | -P          | -P |    |                  |     |
| 4  | Hydrology                      |                  |    |    |              | -P |    |             |    |    |                  |     |
| 5  | Space, Land and Soil           |                  |    |    |              | -P |    |             |    |    |                  |     |
| <b>B. Biological Component</b>                                       |                                |                  |    |    |              |    |    |             |    |    |                  |     |
| 1  | Inland Flora and Fauna         |                  |    |    |              | -P |    |             |    |    |                  |     |
| 2  | Water Biota                    |                  |    |    |              | -P |    | -P          | -P | -P | -P               |     |
| <b>C. Social, Economic, Cultural and Community Health Components</b> |                                |                  |    |    |              |    |    |             |    |    |                  |     |
| 1  | Job and Business Opportunities |                  |    |    | +P           | +P |    | -P          | +P | +P |                  |     |
| 2  | Economy                        |                  |    |    | +P           | +P |    |             | +P | +P |                  | +TP |
| 3  | Traffic Jam and Road Damage    |                  |    |    | -P           | -P |    | -P          |    |    | -P               |     |
| 4  | Community Health               |                  |    |    | -P           | -P |    | +P          | +P |    |                  |     |
| 5  | Community Perception           | ±P               | ±P | ±P | ±P           | ±P | ±P | ±P          | ±P | ±P | ±P               | ±P  |

Remarks :

- 1 Social Service/Socialization
- 2 Survey, Investigation and Design
- 3 Land Acquisition/Land Compensation
- 4 Construction Manpower Recruitment  
Mobilization and Demobilization of  
Equipments and Materials
- 5 Equipment and Materials
- 6 Irrigation Canal Development
- 7 Construction Manpower Severance
- 8 Operation and Maintenance of Canal/Irrigation Facilities
- 9 Optimum Utilization of Irrigation Water
- 10 Canal and Irrigation Facility Management
- 11 Manpower Management

-P : Important Negative

-TP : Unimportant Negative

+P : Important Positive

+TP : Unimportant Positive

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**CHAPTER VI**  
**IMPORTANT IMPACT EVALUATION**

# **CHAPTER VI**

## **Important Impact Evaluation**

### **6.1. Study of Important Impact**

Evaluation on important impact is a comprehensive study of several important impacts in integrate manner that is closely related and interdependent with an objective to determine the balance between important positive impact and important negative impact. The study of important impact related to impact evaluation of secondary and sub-secondary canal development activity will be conducted by using Fisher and Davies method and Flow Chart method.

According to Fandeli (2007), there are three steps in important impact evaluation by using Fisher and Davies method as follows :

1. Composing Table of Basic Evaluation Matrix toward Environment.
2. Composing Matrix to Conduct the Impact Identification and Prediction.
3. Composing Impact Evaluation Matrix and Decision.

The description of important impact evaluation steps for irrigation development is given in the following paragraphs.

#### **6.1.1. Composing Table of Basic Evaluation Matrix toward Environment**

Basic evaluation matrix is essentially developed to get data of environmental color (condition) and some properties of an environment component. Based on study of initial environmental color, then basic evaluation matrix can be determined as shown in Table 6.1.

#### **6.1.2. Composing Matrix to Conduct the Impact Identification and Prediction**

Environmental impact analysis for secondary canal development activity basically is an effort to study impact toward environmental components from this activity. Impact identification and prediction should be done in relation to the above effort. Impact parameters identification to be studied is basically similar to environmental condition. Results of impact identification and prediction (physico-chemical, biological, socioeconomic-cultural and community health) as a results of activity at pre-construction, construction, operational and post-operational stages at secondary canal development activity was shown in Table 4.1 and Table 5.1.

**Table 6.1. Basic Evaluation to Environmental Parameters Affected by Impact of Secondary and Sub-secondary Canal Development Activity.**

| No        | Impact Affected Environmental Parameters                   | Initial Condition of Environmental | Importance to Project | Management Sensitivity |
|-----------|--|------------------------------------|-----------------------|------------------------|
| <b>A.</b> | <b>Physico-Chemical Environment</b>                        |                                    |                       |                        |
| 1.        | Air Quality:   |                                    |                       |                        |
|           | a. NOx   | 3                                  | 4                     | 4                      |
|           | b. SOx   | 3                                  | 4                     | 4                      |
|           | c. H <sub>2</sub> S  | 3                                  | 4                     | 4                      |
|           | d. Dust  | 3                                  | 3                     | 3                      |
| 2.        | Noise  | 4                                  | 4                     | 3                      |
| 3.        | Water Quality  |                                    |                       |                        |
|           | a. Physical  | 3                                  | 3                     | 3                      |
|           | b. Chemical  | 3                                  | 4                     | 4                      |
|           | c. Heavy Metals  | 3                                  | 4                     | 4                      |
| 4.        | Soil Physicochemical Quality                               | 4                                  | 3                     | 3                      |
| 5.        | Erosion  | 4                                  | 3                     | 3                      |
| <b>B.</b> | <b>Biological Environment</b>                              |                                    |                       |                        |
| 1.        | Flora  | 4                                  | 3                     | 4                      |
| 2.        | Fauna  | 4                                  | 2                     | 3                      |
| 3.        | Water Biota  |                                    |                       |                        |
|           | a. Plankton  | 4                                  | 3                     | 3                      |
|           | b. Benthos   | 4                                  | 3                     | 3                      |
|           | c. Nekton  | 4                                  | 4                     | 3                      |
| <b>C.</b> | <b>Socioeconomic-Cultural-Community Health Environment</b> |                                    |                       |                        |
| 1.        | Job and Business Opportunities                             | 2                                  | 4                     | 4                      |
| 2.        | Economy  | 2                                  | 3                     | 3                      |
| 3.        | Traffic Jam and Road Damage                                | 4                                  | 4                     | 4                      |
| 4.        | Community Health   | 4                                  | 3                     | 3                      |
| 5.        | Community Perception                                       | 2                                  | 4                     | 4                      |

Source : Ministry of Environment (?)

Remarks:

|                            |                    |               |                        |             |                  |
|----------------------------|--------------------|---------------|------------------------|-------------|------------------|
| Initial condition:         | 1=very poor        | 2=poor        | 3=medium               | 4=good      | 5=very good      |
| Parameter of Importance:   | 1=very unimportant | 2=unimportant | 3=relatively important | 4=important | 5=very important |
| Sensitivity to management: | 1=very insensitive | 2=insensitive | 3=medium               | 4=sensitive | 5=very sensitive |

### 6.1.3. Composing Impact Evaluation Matrix and Decision

Impact evaluation matrix is consisted of evaluation toward important impacts by comparing the environmental quality at initial condition, certain period without project and certain period with project. The environmental quality difference with project and without project is called impact. Decision can be composed such as shown in Table 6.2 based on important impact matrix and basic evaluation matrix.

Table 6.2. Impact Decision Matrix for Physico-Chemical, Biological, Socioeconomic-Cultural and Community Health at Secondary and Sub-Secondary Canals Development Activity.

| Environmental Components                          | Without Project Condition | With Project     |   |   |              |   |   |   |             |   |    | Importance Level of Impact |   |   |   |   |    |   |   |    |    |    |   |   |  |
|---|---------------------------|------------------|---|---|--------------|---|---|---|-------------|---|----|----------------------------|---|---|---|---|----|---|---|----|----|----|---|---|--|
|   |                           | Pre-Construction |   |   | Construction |   |   |   | Operational |   |    | Post-Operational           |   |   |   |   |    |   |   |    |    |    |   |   |  |
| Present   | Future                    | 1                | 2 | 3 | DP           | D | B | 4 | 5           | 6 | DP | D                          | B | 7 | 8 | 9 | DP | D | B | 10 | 11 | DP | D | B |  |
| <b>A. Physico-Chemical</b>                        |                           |                  |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 1. Air Quality                                    |                           |                  |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| a.NOx   | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| b.SOx   | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| c.H <sub>2</sub> S                                | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| d.Dust  | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 2. Noise  | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 3. Surface Water Quality                          |                           |                  |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| a. Physical                                       | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| b.Chemical  | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| c.Heavy Metals                                    | 3                         | 3                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 4. Soil Quality                                   | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 5. Erosion  | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| <b>B. Biological</b>                              |                           |                  |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 1. Flora  | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 2. Fauna  | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 3. Water Biota                                    |                           |                  |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| a.Plankton  | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| b.Benthos   | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| connection  | 4                         | 4                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| <b>C. Socioeconomic-Cultural-Community Health</b> |                           |                  |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |
| 1. Job and Business Opportunities                 | 2                         | 2                |   |   |              |   |   |   |             |   |    |                            |   |   |   |   |    |   |   |    |    |    |   |   |  |

## Important Impact Evaluation 6 - 4

| Environmental Components       | Without Project Condition | With Project     |   |   |              |   |   |             |   |   |                  |   | Importance Level of Impact |   |   |   |    |   |   |
|--------------------------------|---------------------------|------------------|---|---|--------------|---|---|-------------|---|---|------------------|---|----------------------------|---|---|---|----|---|---|
|                                |                           | Pre-Construction |   |   | Construction |   |   | Operational |   |   | Post-Operational |   |                            |   |   |   |    |   |   |
| Present                        | Future                    | 1                | 2 | 3 | DP           | D | B | 4           | 5 | 6 | DP               | D | B                          | 7 | 8 | 9 | DP | D | B |
| 2. Economy                     | 2                         | 2                |   |   |              |   |   | 4           | 4 | 4 | 2                | 2 |                            | 4 | 4 | 4 | 2  | 2 |   |
| 3. Traffic Jam and Road Damage | 4                         | 4                |   |   |              |   |   | 3           | 3 | 1 | 3                | 2 | 1                          | 1 | 3 | 2 | 3  |   | 3 |
| 4. Community Health            | 4                         | 4                |   |   |              |   |   | 3           | 3 | 1 | 2                | 3 | 3                          | 3 | 1 | 2 | 3  | 3 | 3 |
| 5. Community Perception        | 2                         | 2                | 3 | 3 | 3            | 3 | 1 | 2           | 3 | 3 | 1                | 2 | 3                          | 3 | 3 | 1 | 2  | 3 | 4 |
|                                |                           |                  |   |   |              |   |   |             |   |   |                  |   |                            |   |   |   |    |   | 4 |
|                                |                           |                  |   |   |              |   |   |             |   |   |                  |   |                            |   |   |   |    |   | 5 |

Remarks :

- 1 Extension Service/Socialization
  - 2 Survey, Investigation and Design
  - 3 Land Acquisition/Land Compensation
  - 4 Construction Manpower Recruitment
  - 5 Mobilization and Demobilization of Equipments and Materials
  - 6 Irrigation Canal Development
  - 7 Construction Manpower Disengagement
  - 8 Operation and Maintenance of Canal/Irrigation Facility
  - 9 Optimum Utilization of Irrigation Water
  - 10 Canal and Irrigation Facility Management
  - 11 Manpower Management
- YAD = in the Future

DP = Impact with project  
D = Impact (differences between DP and YAD),  
B= Impact magnitude scale,  
1 = very small,  
2 = small,  
3 = medium,  
4 = high,  
5= very high

Holistic discussion for each impact is presented in the following discussion.

#### **6.1.3.1. Decreasing Air Quality, Increasing Noise and Vibration**

Potential for decreasing air quality at this activity might be caused by increasing exhaust gas content of SO<sub>2</sub> and NO<sub>2</sub> as a result of fuel combustion from vehicles or heavy equipments. Dust which is exposed during heavy equipments operation can also decrease air quality. Dust particulates can be produced from dust of dry soil or from road that is across by heavy equipments and subsequently flown by wind. In addition, dust particulates can also be produced by exhaust gas emission from heavy equipments operation. Floating and flying dust particulates carried by wind will cause irritation on eyes and obscure visibility. Toxic metals spill contained within dust particulates in air is the biggest threat for human health in the surrounding of activity location.

Digging and transportation activities of filling materials by using heavy equipments and truck will produce noise and vibration on buildings available in the surrounding of activity location. This activity has potential to produce impact on increasing noise and vibration along the road lane. Inspection road development is also done by using heavy equipments that will produce noise and vibration. Negative impact of decreasing air quality has impact magnitude of 1 to 2 (small) and impact importance level of 3 (relatively important impact) at construction and post operational stages.

#### **6.1.3.2. Surface Water Quality**

Activity of total cutting for land clearing followed by land preparation at construction stage produce water management problem in form of basic change of soil particles and dissolved organic matter in water body. This is caused by no upright cluster that has function as water holding or buffer which made water conservation function will halted or drastically decrease. Decrease in river water quality is due to increase in turbidity caused by soil particles and dissolved organic matter in water body during soil digging operation by heavy equipments and less of vegetation cover on soil. Negative impact of decreasing water quality has impact magnitude of 1 to 2 (very small to small) and impact importance level of 4 (important) at construction stage. The main pollutant in this construction stage is soil particles that are carried away by surface flow during rainfall and subsequently flow into river. The main parameter that has change is water turbidity

in which TSS and TDS values are increase due to the entering of soil particles into water body.

Other pollutant sources are the use of herbicides in weeds control, fertilizing practice as well as pest and disease control by using pesticides during rice crop rearing. Improper use of herbicides and pesticides will pollute surface water as the receiving water body which in turn will impede the growth and development of waters biota. This made possible due to double or even triple crop plantings provided by project implementation. The use of imbalance fertilizer will cause *eutrofication* in water body. This in turn will facilitate excessive growth of water weeds so that dissolved oxygen content is decrease and subsequently impede the growth and development of waters biota. Negative impact of decreasing water quality at this stage has impact magnitude of 1 (very small) and impact importance level of 4 (important).

#### **6.1.3.3. Space, Land and Soil**

Impact of land clearing activity on soil and land at construction stage is the change of land use from vegetation area into temporary open area so that land clearing will produce impact on local soil fertility because soil nutrients is transported during heavy rainfall and subsequently followed by soil erosion.

Soil erosion will cause top soil losses which affect crops growth and decreasing water quality in the receiving water body especially in term of turbidity level. Land having continuous erosion will lost the productivity value (agricultural productivity value in broad term), whereas soil particles from soil erosion which flow into the receiving body will decrease the comfort of users. These conditions are directly or indirectly will affect socioeconomic condition of community in the surrounding area. Decrease in impact value is 1,0 (very small) and impact importance magnitude is relatively important (score : 3).

#### **6.1.3.4. Inland Flora and Fauna**

Total cutting treatment at land clearing activity cause the lost of all vegetations so that some high upright plants that have significant economic value are also lost. The same condition is also occurred for clump, underbrush or other secondary plants. This in turn make germ plasm source will experience further decrease. As a result of total cutting, the area which is previously as habitat for several wild lives will be disappear and wild

lives migrate to other habitat or the weak individual will be death. Therefore, this condition will cause the decrease in individual abundance of wild lives at activity location. The decrease of impact value is 1,0 (small) and impact importance magnitude is relatively important (score : 3).

#### **6.1.3.5. Decrease of Water Biota Quality**

Impact of decreasing water biota quality and waters ecosystem is derivative impact from decreasing river water quality. In addition, change of river discharge fluctuation will worsen waters biota quality and waters ecosystem so that attention should be given to these aspects. Decrease in impact value is 1,0 (small), and impact importance magnitude is relatively important (score : 3).

#### **6.1.3.6. Job Opportunity, Business Opportunity and Local Economy**

Increase in job opportunity, business opportunity and local economy is the main objective of paddy field development program in Lempuing area. It is hoped that increase of water supply will produce increase in rice yield and other agricultural commodities at three sub-districts area in which most of community members livelihood is farmers. The priority should be given to this objective by always considering environmental condition in order to maintain sustainable development.

Implementation of Secondary and Sub-Secondary Canals development will also has impact on increasing job opportunity, business opportunity and local economy. The development activity will needs manpower in its implementation as previously described. This will give opportunity for community members, especially community members in the surrounding of activity location to work in this project. Moreover, this activity will facilitate the increase in business opportunity due to the increase of materials and manpower accommodation demands in activity. Job and business opportunities are increase by magnitude of 2.0 (small) and classified as important (score : 4).

#### **6.1.3.7. Traffic Jam and Road Damage**

Traffic jam and road damage will occur during mobilization process. Negative impact magnitude toward traffic jam and road damage during construction stage is 1,0 (small), but it has relatively importance level (score : 3). However, traffic condition will be

improved after project implementation because inspection road can be used by community members as access to main roads.

#### **6.1.3.8. Decreasing Community Health**

Decrease in health is derivative impact from decrease in surface water quality used by the community as well as decrease in air quality and increase in noise. Decrease in water quality especially shown by increase in BOD, COD, oil-lipid and TSS as well as decrease in pH due to activity that use heavy equipments which produce derivative impact toward health disorder on community members in the surrounding location that utilize surface water for their daily need. The use of pesticides in agricultural activities can also have direct impact on community health. Impact magnitude toward health disorder is 1,0 (small) at construction and operational stages. This impact is relatively important (score : 3) because impact accumulation from activity has relatively significant risk on community health. However, due to increase of income and improvement of welfare after the project, then community health may be improved.

#### **6.1.3.9. Community Perception**

This activity can produce negative perception from community. Negative perception from community is closely related to land utilization and demolition as well as worry of negative impacts on physical environment condition in the nearby of activity location. Negative perception from community can produce social conflict between initiator/government party and community members or amongst community members, especially the land and building owners if there is no agreement between government and community in land and building acquisition process which results in unrest and social conflict. There is a possibility of double land ownership during identification process and increase in land price besides the involvement of the third party that will take advantage from the implementation process. The community perception is depending on environmental management during construction and operational stages. Negative perception will become positive if the community receives higher benefit before and after implementation activities. The magnitude of community perception impact is 2 (small). This impact is classified as important (score : 4).

## **6.2. The Best Alternative Choice**

Alternatives that will be chosen at Environmental Impact Analysis study are consisted of :

### **6.2.1. Land and Building Acquisition**

The chosen alternative is land acquisition system, either by land purchasing or land compensation at other area that has equivalence value to the previous land and building condition based on Governor Regulation No.25/2009 related to Compensation Tariff Guidelines for Land Utilization as well as Growing Plants and Buildings.

### **6.2.2. Equipment and Materials Mobilization**

Alternative that will be chosen is mobilization activity during the day time.

### **6.2.3. Irrigation Canal Maintenance**

Alternative that will be chosen is maintenance activity in collaboration with private party.

## **6.3. Study as Management Base**

Environmental Management Plan (RKL) should be composed as guidelines in environmental management for activity implementation. Environmental Management Plan is composed with an objective that the involved parties acknowledge the implementation of environmental management as the written document that is agreed upon and as initiator guideline in managing the environment. In addition, environmental management is important as operator guideline in conducting environmental management activities. Environmental Management Plan Document should be composed in detail so that it will provide the guideline for its implementation, the guarantor and supervisor. Environmental management implementation should be referring to items described in important impact evaluation. Environmental Management Plan includes area border of environmental management as the initiator responsibility which consisted of activity/project border, administrative border, social border and ecological border.

Cause and effect relationship (causative) is occurred amongst effort plan or activities and environmental condition which consisted of probable positive and negative impacts. For example, significant and important impacts may occur from efforts/activity

plan toward environmental condition because effort or activity plan is conducted at area that has dense community or at community with low income level and low educational level as well as improper technology application and so on. In addition, attention should be given to community members affected by positive impact and negative impact as well as identification differences between the desired change and the probable change due to effort and/or activity of development.

Management for these environmental components should be based on the principle of *the best available environmental technology*. In addition, the initiator is recommended not only to apply the obligatory environmental management instruments such as Environmental Impact Assessment, but also apply to voluntary instruments as commitment realization of initiator toward environmental conservation.

Environmental Management (RKL) and Environmental Monitoring (RPL) as a part of Environmental Impact Assessment Document is the commitment that should be conducted by the initiator either at pre-construction, construction and operational stages. Their implementation should be adjusted in dynamic nature according to science and technology development as well as natural and social environments found at activity location.

#### **6.4. Recommendation for Environmental Impact Assessment**

Based on the important impact evaluation, the best alternative choice and basic study of environmental management, then this activity is comprehensively assessed as environmentally feasible. Some components of efforts and/or activities have potential to produce important negative impacts so that they should be managed to minimize impacts toward environment.

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
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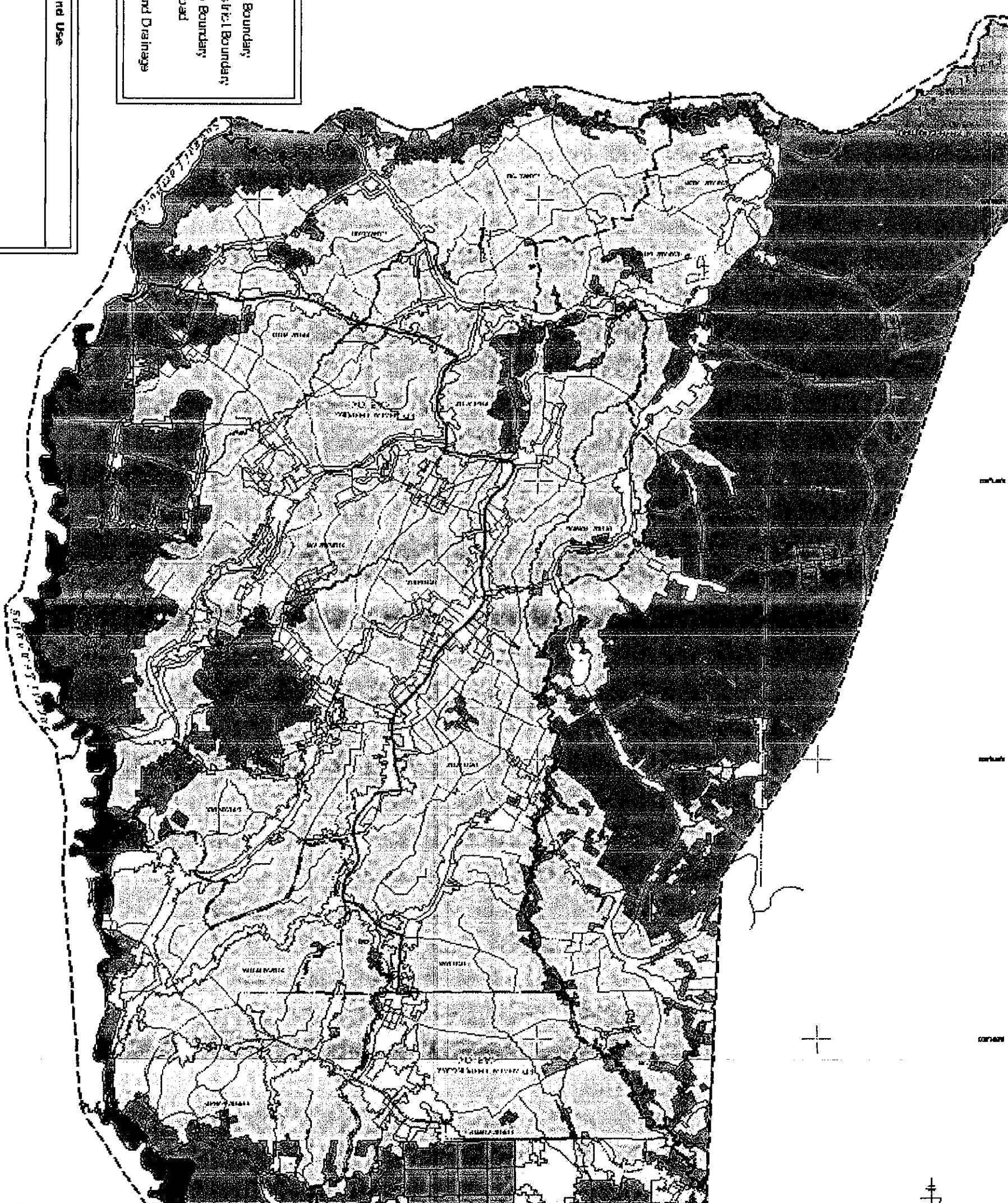
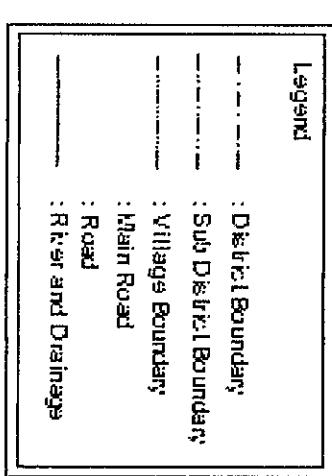
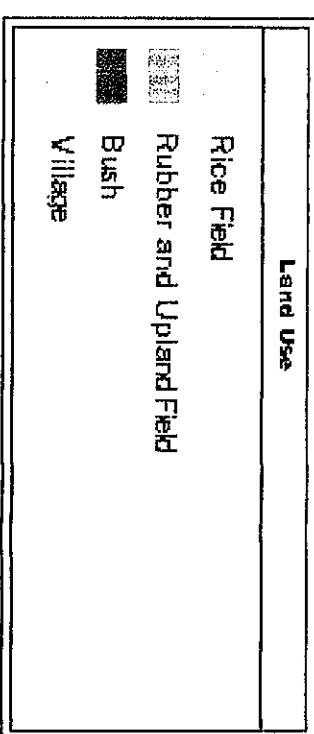
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ENVIRONMENTAL IMPACT ASSESSMENT  
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**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX I**  
Land Use Map at Lempuing Area



APPENDIX I : Land Use Map at Lempuing Area

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX II**  
Komering River Flow Discharge at Perjaya Headworks

**Appendix 2 Monthly Average Inflow to Perjaya**

Discharge (m<sup>3</sup>/s)

|     | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | max | avg | min |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Jan | 294  | 274  | 174  | 109  | 254  | 291  | 178  | 239  | 249  | 238  | 245  | 285  | 301  | 163  | 199  | 178  | 268  | 239  | 312  | 194  | 286  | 287  | 326  | na   | na   | 166  | 198  | 341  | 287  | 410  | 300  | 230  | 284  | 439  | 287  | 286  | 173  | 246  | 439  | 255 | 109 |     |
| Feb | 163  | 259  | 308  | 193  | 366  | 193  | 176  | 212  | 233  | 177  | 194  | 206  | 196  | 155  | 174  | 217  | 226  | 189  | 231  | 271  | 207  | 220  | 223  | na   | na   | na   | 109  | 307  | 315  | 188  | 188  | 187  | 404  | 338  | 425  | 427  | 260  | 189  | 275  | 427 | 239 | 109 |
| Mar | 198  | 257  | 238  | 116  | 197  | 252  | 183  | 268  | 163  | 282  | 324  | 243  | 237  | 299  | 214  | 275  | 309  | 270  | 224  | 252  | 258  | 244  | 238  | na   | na   | na   | 154  | 399  | 243  | 133  | 213  | 282  | 382  | 282  | 547  | 182  | 175  | 251  | 208  | 547 | 249 | 116 |
| Apr | 385  | 268  | 307  | 281  | 258  | 315  | 251  | 135  | 193  | 309  | 258  | 208  | 168  | 188  | 205  | 242  | 158  | 184  | 138  | 216  | 188  | 200  | na   | na   | na   | 182  | 412  | 107  | 217  | 276  | 380  | 245  | 315  | 398  | 251  | 377  | 335  | 297  | 412  | 250 | 107 |     |
| May | 223  | 311  | 288  | 298  | 115  | 157  | 110  | 238  | 152  | 139  | 292  | 205  | 239  | 299  | 182  | 175  | 275  | 215  | 133  | 195  | 282  | 320  | 372  | na   | na   | 357  | 367  | 193  | 175  | 273  | 281  | 276  | 427  | 308  | 207  | 260  | 145  | 200  | 427  | 241 | 110 |     |
| Jun | 139  | 155  | 193  | 121  | 118  | 99   | 175  | 92   | 118  | 131  | 144  | 144  | 135  | 148  | 139  | 157  | 197  | 167  | 126  | 129  | 101  | 114  | 139  | na   | na   | 105  | 268  | 136  | 192  | 233  | 174  | 129  | 160  | 387  | 150  | 182  | 153  | 131  | 387  | 155 | 92  |     |
| Jul | 94   | 54   | 89   | 90   | 101  | 72   | 124  | 107  | 135  | 107  | 167  | 68   | 116  | 116  | 80   | 93   | 125  | 78   | 125  | 65   | 148  | 159  | na   | na   | 75   | 137  | 113  | 159  | 141  | 189  | 184  | 162  | 188  | 143  | 87   | 111  | 115  | 189  | 117  | 54  |     |     |
| Aug | 92   | 48   | 125  | 108  | 138  | 88   | 51   | 76   | 80   | 148  | 87   | 50   | 82   | 111  | 112  | 83   | 72   | 148  | 68   | 140  | 49   | 153  | 130  | na   | na   | 57   | 209  | 79   | 191  | 115  | 98   | 143  | 98   | 208  | 94   | 72   | 122  | 108  | 209  | 108 | 48  |     |
| Sep | 94   | 48   | 279  | 276  | 141  | 72   | 74   | 127  | 78   | 155  | 172  | 33   | 83   | 194  | 105  | 133  | 77   | 125  | 114  | 119  | 42   | 159  | 81   | na   | na   | 40   | 171  | 68   | 86   | 108  | 79   | 133  | 88   | 138  | 72   | 120  | 178  | 58   | 279  | 114 | 33  |     |
| Oct | 162  | 30   | 175  | 312  | 148  | 288  | 45   | 119  | 107  | 129  | 172  | 30   | 116  | 148  | 148  | 181  | 75   | 84   | 78   | 75   | 31   | 158  | 89   | na   | na   | 291  | 43   | 222  | 182  | 101  | 215  | 57   | 658  | 81   | 204  | 84   | 108  | 187  | 92   | 656 | 146 | 30  |
| Nov | 284  | 65   | 184  | 159  | 202  | 355  | 89   | 228  | 165  | 312  | 235  | 31   | 207  | 140  | 168  | 241  | 78   | 195  | 234  | 105  | 75   | 285  | 148  | na   | na   | 228  | 54   | 189  | 239  | 254  | 284  | 75   | 411  | 109  | 348  | 103  | 145  | 327  | 117  | 411 | 180 | 31  |
| Des | 287  | 186  | 182  | 222  | 158  | 242  | 310  | 280  | 180  | 324  | 228  | 150  | 282  | 165  | 215  | 277  | 210  | 202  | 288  | 199  | 242  | 288  | 284  | na   | na   | 207  | 109  | 143  | 214  | 247  | 226  | 803  | 303  | 208  | 218  | 275  | 244  | 288  | 803  | 246 | 109 |     |
| max | 385  | 311  | 307  | 312  | 386  | 355  | 310  | 280  | 249  | 324  | 285  | 301  | 299  | 215  | 277  | 309  | 270  | 312  | 271  | 286  | 320  | 372  |      |      |      | 357  | 412  | 341  | 287  | 410  | 360  | 803  | 427  | 547  | 427  | 377  | 335  | 297  |      | 255 |     |     |
| avg | 201  | 163  | 211  | 189  | 183  | 200  | 147  | 177  | 155  | 204  | 209  | 137  | 177  | 178  | 163  | 184  | 177  | 177  | 172  | 162  | 153  | 213  | 198  |      |      |      | 122  | 232  | 186  | 184  | 223  | 193  | 330  | 217  | 318  | 181  | 196  | 200  | 178  | 330 | 192 | 122 |
| min | 92   | 30   | 89   | 80   | 101  | 72   | 45   | 76   | 78   | 107  | 87   | 30   | 63   | 111  | 105  | 80   | 72   | 94   | 68   | 75   | 31   | 114  | 81   |      |      |      | 40   | 137  | 68   | 88   | 106  | 57   | 129  | 81   | 138  | 64   | 72   | 111  | 58   |     | 108 |     |

## Appendix 2. Discharge to Perjaya Headworks(Martapura), to Ranau Regulating Facility & Dam(1/4)

**5-day Mean Discharge**

**\*\* Before construction \*\***

| Year           | 1971             |          |       | 1972             |          |       | 1973             |          |       | 1974             |          |       | 1975             |          |       | 1976             |          |       | 1977             |          |       | 1978             |          |       |     |    |    |
|----------------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|-----|----|----|
|                | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       |     |    |    |
| Five day Order | Martapura        | Dam site | Ranau |     |    |    |
| Jan - 1        | 288              | 66       | 20    | 180              | 44       | 16    | 121              | 30       | 12    | 134              | 38       | 18    | 270              | 62       | 19    | 288              | 61       | 14    | 176              | 44       | 17    | 239              | 53       | 14    | 248 | 65 | 27 |
| Jan - 2        | 357              | 81       | 23    | 190              | 46       | 16    | 207              | 46       | 13    | 121              | 35       | 17    | 275              | 64       | 20    | 352              | 73       | 15    | 134              | 37       | 17    | 229              | 51       | 14    | 257 | 67 | 27 |
| Jan - 3        | 413              | 92       | 25    | 409              | 92       | 25    | 216              | 49       | 14    | 104              | 31       | 16    | 182              | 48       | 21    | 269              | 64       | 17    | 139              | 39       | 18    | 263              | 59       | 17    | 278 | 70 | 27 |
| Jan - 4        | 323              | 73       | 21    | 253              | 59       | 19    | 229              | 51       | 14    | 87               | 27       | 15    | 160              | 44       | 20    | 265              | 64       | 22    | 151              | 41       | 19    | 264              | 60       | 18    | 267 | 68 | 27 |
| Jan - 5        | 214              | 51       | 17    | 329              | 75       | 22    | 156              | 39       | 15    | 77               | 25       | 15    | 233              | 56       | 19    | 280              | 68       | 24    | 249              | 62       | 23    | 289              | 63       | 20    | 219 | 60 | 27 |
| Jan - 6        | 170              | 41       | 15    | 280              | 65       | 20    | 117              | 31       | 14    | 129              | 33       | 14    | 405              | 87       | 20    | 271              | 66       | 23    | 219              | 57       | 24    | 169              | 46       | 21    | 226 | 62 | 28 |
| Feb - 1        | 143              | 36       | 14    | 247              | 57       | 18    | 130              | 34       | 14    | 193              | 46       | 15    | 520              | 108      | 21    | 200              | 53       | 22    | 214              | 57       | 24    | 160              | 45       | 21    | 211 | 59 | 28 |
| Feb - 2        | 137              | 35       | 14    | 250              | 63       | 24    | 208              | 48       | 15    | 248              | 56       | 16    | 641              | 131      | 24    | 214              | 56       | 23    | 253              | 64       | 25    | 182              | 47       | 19    | 234 | 63 | 28 |
| Feb - 3        | 134              | 34       | 14    | 259              | 69       | 29    | 211              | 49       | 16    | 283              | 63       | 17    | 317              | 75       | 25    | 166              | 47       | 23    | 202              | 57       | 27    | 247              | 57       | 18    | 273 | 72 | 30 |
| Feb - 4        | 167              | 41       | 15    | 307              | 78       | 30    | 371              | 79       | 18    | 173              | 44       | 17    | 253              | 64       | 25    | 174              | 49       | 23    | 180              | 52       | 26    | 212              | 50       | 17    | 257 | 68 | 29 |
| Feb - 5        | 196              | 47       | 16    | 268              | 70       | 29    | 467              | 96       | 20    | 144              | 38       | 16    | 224              | 57       | 22    | 210              | 54       | 22    | 107              | 39       | 25    | 262              | 59       | 17    | 236 | 64 | 28 |
| Feb - 6        | 201              | 49       | 17    | 221              | 63       | 30    | 448              | 94       | 20    | 114              | 32       | 15    | 238              | 56       | 18    | 195              | 52       | 22    | 97               | 35       | 23    | 207              | 50       | 18    | 183 | 54 | 27 |
| Mar - 1        | 125              | 33       | 14    | 156              | 51       | 30    | 299              | 68       | 20    | 154              | 42       | 19    | 244              | 58       | 19    | 186              | 50       | 22    | 146              | 42       | 21    | 204              | 49       | 17    | 154 | 48 | 26 |
| Mar - 2        | 191              | 46       | 18    | 136              | 47       | 29    | 269              | 63       | 20    | 107              | 34       | 19    | 221              | 55       | 20    | 171              | 47       | 22    | 140              | 41       | 21    | 309              | 71       | 21    | 146 | 46 | 26 |
| Mar - 3        | 205              | 49       | 17    | 216              | 61       | 29    | 260              | 61       | 19    | 94               | 30       | 17    | 199              | 51       | 20    | 205              | 53       | 21    | 170              | 46       | 21    | 268              | 68       | 22    | 111 | 39 | 24 |
| Mar - 4        | 229              | 54       | 18    | 286              | 73       | 28    | 173              | 44       | 18    | 122              | 34       | 16    | 232              | 56       | 19    | 237              | 58       | 21    | 217              | 54       | 20    | 333              | 77       | 23    | 110 | 38 | 23 |
| Mar - 5        | 155              | 39       | 15    | 400              | 92       | 28    | 201              | 49       | 18    | 111              | 31       | 15    | 164              | 43       | 18    | 386              | 86       | 23    | 163              | 44       | 20    | 263              | 61       | 19    | 163 | 48 | 24 |
| Mar - 6        | 283              | 65       | 20    | 345              | 83       | 28    | 226              | 54       | 18    | 107              | 30       | 15    | 121              | 36       | 19    | 326              | 76       | 24    | 264              | 65       | 23    | 196              | 47       | 16    | 293 | 72 | 26 |
| Apr - 1        | 512              | 113      | 29    | 186              | 53       | 26    | 320              | 72       | 20    | 168              | 41       | 15    | 175              | 48       | 22    | 255              | 63       | 23    | 370              | 88       | 29    | 192              | 53       | 24    | 219 | 62 | 29 |
| Apr - 2        | 484              | 107      | 28    | 152              | 47       | 26    | 323              | 72       | 20    | 240              | 55       | 17    | 211              | 54       | 22    | 458              | 99       | 23    | 192              | 56       | 28    | 120              | 39       | 22    | 233 | 65 | 30 |
| Apr - 3        | 297              | 68       | 20    | 227              | 61       | 26    | 301              | 69       | 20    | 320              | 70       | 18    | 474              | 98       | 19    | 228              | 58       | 23    | 271              | 71       | 29    | 157              | 43       | 19    | 225 | 63 | 29 |
| Apr - 4        | 362              | 82       | 23    | 257              | 67       | 28    | 317              | 73       | 22    | 395              | 84       | 19    | 382              | 82       | 19    | 256              | 62       | 22    | 182              | 54       | 28    | 95               | 31       | 18    | 152 | 49 | 28 |
| Apr - 5        | 385              | 87       | 24    | 389              | 91       | 29    | 374              | 83       | 22    | 251              | 57       | 17    | 219              | 54       | 20    | 257              | 63       | 22    | 331              | 79       | 26    | 97               | 31       | 18    | 145 | 48 | 28 |
| Apr - 6        | 268              | 62       | 19    | 396              | 93       | 30    | 208              | 52       | 20    | 191              | 47       | 17    | 95               | 32       | 20    | 437              | 95       | 23    | 157              | 48       | 26    | 150              | 40       | 18    | 185 | 50 | 22 |
| May - 1        | 251              | 59       | 19    | 380              | 87       | 30    | 196              | 48       | 17    | 250              | 56       | 16    | 99               | 27       | 12    | 377              | 88       | 27    | 136              | 44       | 25    | 252              | 58       | 18    | 250 | 67 | 29 |
| May - 2        | 279              | 65       | 20    | 393              | 94       | 31    | 260              | 60       | 18    | 253              | 56       | 15    | 91               | 27       | 14    | 190              | 53       | 25    | 131              | 44       | 26    | 292              | 66       | 19    | 181 | 54 | 28 |
| May - 3        | 213              | 51       | 17    | 232              | 64       | 29    | 360              | 78       | 19    | 356              | 74       | 15    | 113              | 30       | 13    | 125              | 41       | 24    | 135              | 47       | 29    | 269              | 67       | 21    | 153 | 48 | 27 |
| May - 4        | 171              | 42       | 15    | 249              | 66       | 28    | 329              | 73       | 19    | 352              | 73       | 15    | 144              | 41       | 20    | 111              | 37       | 22    | 93               | 37       | 26    | 316              | 74       | 23    | 108 | 39 | 25 |
| May - 5        | 216              | 51       | 17    | 407              | 95       | 29    | 275              | 62       | 18    | 333              | 69       | 14    | 121              | 37       | 20    | 75               | 28       | 19    | 81               | 33       | 24    | 178              | 48       | 21    | 113 | 40 | 25 |
| May - 6        | 209              | 50       | 17    | 227              | 61</td   |       |                  |          |       |                  |          |       |                  |          |       |                  |          |       |                  |          |       |                  |          |       |     |    |    |

## Appendix 5. Discharge to Perjaya Headworks(Martapura), to Ranau Regulating Facility & Dam(2/4)

### 5-day Mean Discharge

\*\* Before construction \*\*

| Year    | 1980              |          |       | 1981             |          |       | 1982             |          |       | 1983             |          |       | 1984             |          |       | 1985             |          |       | 1986             |          |       | 1987             |          |       | 1988             |          |       |
|---------|-------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|
|         | Five day<br>Order |          |       | Discharge (m³/s) |          |       |
|         | Martapura         | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau | Martapura        | Dem site | Ranau |
| Jan - 1 | 228               | 54       | 18    | 349              | 85       | 30    | 303              | 71       | 22    | 206              | 44       | 11    | 145              | 36       | 14    | 175              | 47       | 21    | 203              | 51       | 20    | 276              | 81       | 40    | 217              | 50       | 15    |
| Jan - 2 | 275               | 64       | 20    | 330              | 82       | 30    | 333              | 77       | 24    | 303              | 62       | 12    | 129              | 34       | 15    | 189              | 51       | 22    | 172              | 51       | 25    | 308              | 89       | 43    | 178              | 44       | 16    |
| Jan - 3 | 265               | 61       | 19    | 194              | 57       | 29    | 345              | 80       | 25    | 356              | 72       | 12    | 146              | 39       | 16    | 201              | 55       | 25    | 226              | 63       | 29    | 336              | 95       | 45    | 203              | 47       | 15    |
| Jan - 4 | 264               | 61       | 19    | 144              | 47       | 27    | 295              | 72       | 25    | 379              | 76       | 13    | 238              | 53       | 15    | 211              | 55       | 23    | 169              | 51       | 27    | 280              | 85       | 44    | 245              | 55       | 15    |
| Jan - 5 | 226               | 54       | 18    | 257              | 67       | 27    | 204              | 56       | 25    | 315              | 69       | 17    | 179              | 43       | 15    | 209              | 55       | 23    | 143              | 46       | 26    | 233              | 75       | 42    | 341              | 73       | 17    |
| Jan - 6 | 171               | 44       | 18    | 195              | 55       | 26    | 231              | 60       | 24    | 248              | 58       | 18    | 137              | 35       | 14    | 209              | 55       | 23    | 154              | 48       | 26    | 177              | 64       | 41    | 248              | 58       | 18    |
| Feb - 1 | 144               | 46       | 26    | 180              | 52       | 26    | 158              | 47       | 24    | 233              | 54       | 17    | 144              | 35       | 13    | 210              | 56       | 24    | 304              | 76       | 28    | 201              | 67       | 39    | 197              | 49       | 18    |
| Feb - 2 | 141               | 45       | 25    | 217              | 59       | 26    | 157              | 48       | 26    | 228              | 52       | 16    | 119              | 31       | 13    | 243              | 63       | 26    | 254              | 69       | 30    | 223              | 71       | 38    | 213              | 53       | 20    |
| Feb - 3 | 132               | 42       | 24    | 162              | 49       | 26    | 279              | 70       | 26    | 185              | 43       | 14    | 173              | 40       | 12    | 224              | 59       | 25    | 221              | 64       | 31    | 213              | 70       | 40    | 177              | 46       | 19    |
| Feb - 4 | 150               | 46       | 25    | 180              | 52       | 26    | 219              | 59       | 26    | 162              | 39       | 14    | 192              | 44       | 13    | 157              | 45       | 22    | 197              | 60       | 32    | 243              | 77       | 42    | 170              | 43       | 17    |
| Feb - 5 | 213               | 59       | 27    | 259              | 68       | 28    | 281              | 69       | 25    | 181              | 42       | 13    | 135              | 33       | 12    | 111              | 34       | 19    | 164              | 53       | 30    | 249              | 78       | 42    | 210              | 50       | 17    |
| Feb - 6 | 284               | 71       | 27    | 163              | 51       | 28    | 141              | 44       | 24    | 188              | 43       | 13    | 164              | 38       | 12    | 100              | 32       | 18    | 162              | 52       | 30    | 236              | 77       | 44    | 165              | 41       | 16    |
| Mar - 1 | 293               | 73       | 27    | 194              | 57       | 29    | 185              | 51       | 23    | 249              | 54       | 13    | 244              | 54       | 14    | 98               | 31       | 17    | 172              | 54       | 30    | 263              | 88       | 47    | 160              | 40       | 15    |
| Mar - 2 | 384               | 90       | 28    | 212              | 61       | 30    | 231              | 59       | 23    | 208              | 47       | 14    | 292              | 65       | 17    | 116              | 35       | 18    | 238              | 69       | 34    | 422              | 113      | 48    | 262              | 56       | 15    |
| Mar - 3 | 363               | 85       | 27    | 276              | 72       | 29    | 279              | 66       | 22    | 273              | 58       | 13    | 320              | 69       | 16    | 223              | 52       | 17    | 329              | 92       | 42    | 298              | 89       | 45    | 312              | 66       | 15    |
| Mar - 4 | 286               | 71       | 26    | 425              | 99       | 30    | 346              | 79       | 23    | 193              | 43       | 12    | 315              | 69       | 17    | 314              | 68       | 17    | 298              | 89       | 46    | 230              | 74       | 42    | 266              | 60       | 17    |
| Mar - 5 | 168               | 49       | 25    | 315              | 80       | 31    | 238              | 59       | 22    | 227              | 50       | 13    | 286              | 63       | 16    | 316              | 69       | 17    | 368              | 101      | 45    | 273              | 81       | 41    | 368              | 79       | 19    |
| Mar - 6 | 196               | 54       | 25    | 521              | 119      | 34    | 182              | 49       | 21    | 274              | 58       | 13    | 339              | 72       | 16    | 219              | 50       | 15    | 246              | 80       | 45    | 349              | 92       | 38    | 249              | 58       | 18    |
| Apr - 1 | 288               | 70       | 25    | 338              | 87       | 35    | 156              | 44       | 21    | 180              | 42       | 13    | 250              | 56       | 16    | 181              | 43       | 15    | 186              | 67       | 42    | 197              | 64       | 37    | 194              | 48       | 18    |
| Apr - 2 | 205               | 57       | 26    | 352              | 91       | 36    | 138              | 40       | 20    | 176              | 41       | 13    | 197              | 48       | 17    | 190              | 44       | 14    | 218              | 71       | 41    | 202              | 64       | 36    | 159              | 41       | 17    |
| Apr - 3 | 202               | 58       | 28    | 206              | 66       | 37    | 178              | 47       | 20    | 185              | 39       | 13    | 215              | 50       | 16    | 223              | 52       | 16    | 226              | 72       | 40    | 193              | 64       | 37    | 153              | 40       | 17    |
| Apr - 4 | 354               | 84       | 28    | 215              | 67       | 36    | 277              | 65       | 21    | 148              | 36       | 13    | 193              | 47       | 17    | 231              | 53       | 16    | 199              | 66       | 38    | 152              | 61       | 42    | 134              | 38       | 18    |
| Apr - 5 | 344               | 82       | 27    | 216              | 66       | 35    | 211              | 53       | 20    | 168              | 43       | 17    | 167              | 43       | 17    | 157              | 40       | 16    | 171              | 60       | 37    | 429              | 111      | 44    | 142              | 39       | 18    |
| Apr - 6 | 462               | 98       | 22    | 211              | 59       | 27    | 273              | 60       | 16    | 176              | 42       | 14    | 152              | 37       | 13    | 143              | 34       | 12    | 231              | 64       | 29    | 281              | 76       | 33    | 168              | 43       | 17    |
| May - 1 | 197               | 57       | 28    | 244              | 68       | 32    | 278              | 65       | 20    | 191              | 46       | 16    | 264              | 60       | 17    | 125              | 33       | 14    | 282              | 79       | 37    | 447              | 113      | 43    | 249              | 57       | 17    |
| May - 2 | 134               | 47       | 29    | 319              | 82       | 32    | 227              | 55       | 19    | 192              | 47       | 17    | 298              | 66       | 18    | 159              | 39       | 14    | 224              | 69       | 37    | 225              | 78       | 47    | 265              | 60       | 17    |
| May - 3 | 170               | 54       | 30    | 330              | 84       | 32    | 219              | 53       | 19    | 261              | 60       | 18    | 351              | 75       | 17    | 237              | 52       | 14    | 163              | 56       | 34    | 394              | 110      | 51    | 185              | 47       | 18    |
| May - 4 | 119               | 44       | 28    | 290              | 77       | 32    | 184              | 46       | 18    | 296              | 67       | 19    | 318              | 69       | 17    | 238              | 53       | 15    | 129              | 45       | 28    | 175              | 68       | 46    | 244              | 58       | 19    |
| May - 5 | 104               | 41       | 28    | 374              | 92       | 33    | 148              | 40       | 18    | 242              | 58       | 20    | 311              | 68       | 17    | 180              | 44       | 16    | 1                |          |       |                  |          |       |                  |          |       |

## Appendix 5. Discharge to Perjaya Headworks(Martapura), to Ranau Regulating Facility & Dam(3/4)

### 5-day Mean Discharge

**\*\* Before construction \*\***

| Year    | 1989             |          |       | 1990             |          |       | 1991             |          |       | 1992             |          |       | 1993             |          |       | 1996             |          |       | 1997             |          |       | 1998             |          |       | 1999             |          |       |
|---------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|
|         | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       |
|         | Month            | Dam site | Ranau |
| Jan - 1 | 224              | 53       | 18    | 298              | 66       | 18    | 257              | 58       | 17    | 236              | 54       | 16    | 365              | 87       | 24    |                  |          |       | 136              | 33       | 12    | 64               | 15       | 6     | 140              | 36       | 15    |
| Jan - 2 | 243              | 58       | 20    | 256              | 58       | 17    | 272              | 60       | 16    | 317              | 67       | 15    | 361              | 82       | 23    |                  |          |       | 122              | 30       | 11    | 189              | 46       | 17    | 158              | 44       | 21    |
| Jan - 3 | 354              | 80       | 23    | 204              | 48       | 16    | 291              | 64       | 16    | 232              | 53       | 16    | 261              | 61       | 19    |                  |          |       | 227              | 56       | 20    | 180              | 44       | 16    | 424              | 97       | 28    |
| Jan - 4 | 375              | 86       | 26    | 163              | 42       | 17    | 341              | 73       | 17    | 314              | 67       | 15    | 256              | 60       | 19    |                  |          |       | 207              | 51       | 18    | 306              | 76       | 27    | 683              | 148      | 35    |
| Jan - 5 | 376              | 87       | 27    | 129              | 36       | 17    | 288              | 65       | 18    | 349              | 71       | 13    | 443              | 98       | 26    |                  |          |       | 160              | 39       | 14    | 223              | 55       | 20    | 434              | 101      | 32    |
| Jan - 6 | 297              | 72       | 25    | 115              | 34       | 17    | 267              | 63       | 21    | 272              | 56       | 13    | 248              | 58       | 18    |                  |          |       | 142              | 35       | 13    | 226              | 55       | 20    | 208              | 61       | 31    |
| Feb - 1 | 184              | 52       | 25    | 339              | 79       | 24    | 227              | 56       | 20    | 400              | 79       | 12    | 193              | 46       | 16    |                  |          |       | 118              | 29       | 10    | 255              | 63       | 23    | 237              | 57       | 20    |
| Feb - 2 | 206              | 60       | 30    | 323              | 75       | 23    | 291              | 69       | 23    | 217              | 47       | 12    | 250              | 58       | 18    |                  |          |       | 132              | 32       | 12    | 443              | 110      | 39    | 443              | 92       | 18    |
| Feb - 3 | 244              | 68       | 32    | 283              | 66       | 21    | 201              | 52       | 21    | 121              | 31       | 13    | 260              | 61       | 19    |                  |          |       | 138              | 34       | 12    | 279              | 69       | 25    | 281              | 58       | 12    |
| Feb - 4 | 212              | 62       | 31    | 244              | 59       | 21    | 192              | 49       | 20    | 129              | 32       | 12    | 242              | 57       | 18    |                  |          |       | 98               | 24       | 9     | 255              | 63       | 23    | 255              | 53       | 11    |
| Feb - 5 | 261              | 71       | 32    | 224              | 56       | 21    | 176              | 47       | 20    | 180              | 41       | 12    | 223              | 52       | 17    |                  |          |       | 94               | 23       | 8     | 249              | 61       | 22    | 246              | 56       | 16    |
| Feb - 6 | 278              | 74       | 32    | 212              | 54       | 21    | 154              | 42       | 19    | 272              | 56       | 11    | 169              | 41       | 15    |                  |          |       | 75               | 18       | 7     | 363              | 90       | 32    | 429              | 90       | 19    |
| Mar - 1 | 300              | 79       | 33    | 226              | 55       | 21    | 203              | 49       | 17    | 170              | 37       | 10    | 281              | 65       | 20    |                  |          |       | 87               | 21       | 8     | 325              | 80       | 29    | 294              | 69       | 22    |
| Mar - 2 | 231              | 65       | 30    | 228              | 57       | 21    | 247              | 57       | 17    | 239              | 49       | 10    | 295              | 66       | 20    |                  |          |       | 95               | 23       | 8     | 401              | 99       | 36    | 266              | 70       | 29    |
| Mar - 3 | 244              | 66       | 29    | 211              | 54       | 22    | 292              | 65       | 18    | 243              | 51       | 11    | 243              | 57       | 18    |                  |          |       | 103              | 25       | 9     | 445              | 110      | 40    | 298              | 71       | 24    |
| Mar - 4 | 162              | 49       | 26    | 236              | 58       | 21    | 223              | 52       | 17    | 271              | 58       | 13    | 191              | 46       | 16    |                  |          |       | 176              | 43       | 16    | 391              | 97       | 35    | 258              | 51       | 8     |
| Mar - 5 | 167              | 50       | 26    | 297              | 70       | 22    | 263              | 59       | 17    | 245              | 54       | 14    | 201              | 49       | 17    |                  |          |       | 329              | 81       | 29    | 426              | 105      | 38    | 177              | 39       | 10    |
| Mar - 6 | 240              | 64       | 27    | 314              | 72       | 22    | 322              | 70       | 17    | 296              | 63       | 14    | 219              | 52       | 17    |                  |          |       | 132              | 32       | 12    | 405              | 100      | 36    | 163              | 39       | 14    |
| Apr - 1 | 248              | 65       | 27    | 211              | 54       | 21    | 235              | 57       | 20    | 215              | 48       | 13    | 167              | 41       | 15    |                  |          |       | 163              | 40       | 14    | 386              | 95       | 34    | 131              | 22       | 0     |
| Apr - 2 | 216              | 61       | 29    | 155              | 45       | 22    | 205              | 53       | 22    | 157              | 37       | 12    | 187              | 45       | 16    |                  |          |       | 134              | 33       | 12    | 499              | 123      | 44    | 115              | 20       | 0     |
| Apr - 3 | 253              | 69       | 31    | 122              | 38       | 21    | 203              | 54       | 23    | 151              | 35       | 11    | 185              | 45       | 16    |                  |          |       | 213              | 52       | 19    | 399              | 98       | 35    | 89               | 15       | 0     |
| Apr - 4 | 160              | 53       | 31    | 109              | 35       | 20    | 246              | 61       | 23    | 172              | 38       | 10    | 165              | 41       | 15    |                  |          |       | 262              | 64       | 23    | 450              | 111      | 40    | 90               | 15       | 0     |
| Apr - 5 | 121              | 43       | 27    | 98               | 32       | 19    | 230              | 58       | 22    | 204              | 45       | 12    | 245              | 57       | 18    |                  |          |       | 185              | 45       | 17    | 400              | 99       | 36    | 88               | 15       | 1     |
| Apr - 6 | 105              | 38       | 25    | 132              | 38       | 19    | 179              | 47       | 20    | 228              | 50       | 13    | 248              | 58       | 18    |                  |          |       | 193              | 47       | 17    | 340              | 84       | 30    | 128              | 25       | 4     |
| May - 1 | 125              | 41       | 24    | 288              | 66       | 20    | 155              | 41       | 18    | 376              | 76       | 13    | 626              | 130      | 26    |                  |          |       | 470              | 116      | 42    | 342              | 84       | 30    | 134              | 42       | 23    |
| May - 2 | 121              | 40       | 23    | 277              | 64       | 20    | 400              | 86       | 20    | 334              | 69       | 13    | 532              | 114      | 26    |                  |          |       | 545              | 135      | 48    | 369              | 91       | 33    | 185              | 53       | 25    |
| May - 3 | 173              | 48       | 22    | 226              | 54       | 18    | 452              | 97       | 22    | 460              | 92       | 15    | 402              | 91       | 26    |                  |          |       | 413              | 102      | 37    | 491              | 121      | 44    | 260              | 59       | 17    |
| May - 4 | 119              | 38       | 21    | 129              | 37       | 18    | 229              | 57       | 21    | 344              | 72       | 15    | 279              | 68       | 24    |                  |          |       | 253              | 62       | 22    | 428              | 106      | 38    | 184              | 46       | 18    |
| May - 5 | 108              | 35       | 20    | 108              | 31       | 16    | 169              | 45       | 20    | 233              | 51       | 13    | 176              | 48       | 22    |                  |          |       | 247              | 61       | 22    | 303              | 75       | 27    | 178              | 45       | 17    |
| May - 6 | 149              | 42       | 20    | 142              | 37       | 15    | 168              | 44       | 18    | 171              | 40       | 13    | 215              | 55       | 22    |                  |          |       | 214              | 52       | 19    | 272              | 67       | 24    | 218              | 52       | 17    |
| Jun - 1 | 156              | 42       | 19    | 152              | 40       | 17    | 133              | 36       | 16    | 131              | 32       | 12    | 155              | 4        |       |                  |          |       |                  |          |       |                  |          |       |                  |          |       |

## Appendix 5. Discharge to Perjaya Headworks(Martapura), to Ranau Regulating Facility & Dam(4/4)

### 5-day Mean Discharge

\*\* Before construction \*\*

| Year    | 2000             |          |       | 2001             |          |       | 2002             |          |       | 2003             |          |       | 2004             |          |       | 2005             |          |       | 2006             |          |       | 2007             |          |       | 2008             |          |       |     |    |      |
|---------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|------------------|----------|-------|-----|----|------|
|         | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       | Discharge (m³/s) |          |       |     |    |      |
|         | Month            | Dam site | Ranau |     |    |      |
| Jan - 1 | 280              | 67       | 23    | 678              | 135      | 21    | 220              | 45       | 8     | 188              | 51       | 23    | 250              | 54       | 13    | 358              | 89       | 33    | 191              | 38       | 6,6   | 164              | 42       | 17,1  | 113              | 31       | 14,6  | 245 | 68 | 30,9 |
| Jan - 2 | 324              | 75       | 23    | 856              | 166      | 21    | 202              | 42       | 8     | 192              | 49       | 19    | 236              | 48       | 9     | 645              | 139      | 33    | 287              | 55       | 6,6   | 138              | 38       | 17,1  | 139              | 33       | 10,8  | 271 | 72 | 30,9 |
| Jan - 3 | 262              | 68       | 23    | 252              | 61       | 21    | 285              | 56       | 8     | 130              | 34       | 14    | 253              | 58       | 17    | 649              | 140      | 33    | 277              | 53       | 6,6   | 125              | 35       | 17,1  | 127              | 27       | 6,1   | 227 | 65 | 30,9 |
| Jan - 4 | 270              | 65       | 23    | 157              | 36       | 11    | 299              | 59       | 9     | 257              | 56       | 14    | 246              | 67       | 30    | 392              | 95       | 33    | 414              | 77       | 6,6   | 152              | 40       | 17,1  | 105              | 23       | 6,1   | 236 | 66 | 30,4 |
| Jan - 5 | 251              | 61       | 21    | 172              | 38       | 10    | 489              | 93       | 9     | 232              | 52       | 14    | 326              | 72       | 19    | 302              | 79       | 33    | 239              | 43       | 1,9   | 424              | 88       | 17,1  | 185              | 37       | 6,1   | 214 | 62 | 30,4 |
| Jan - 6 | 194              | 42       | 11    | 346              | 68       | 10    | 306              | 61       | 9     | 379              | 77       | 14    | 273              | 59       | 15    | 285              | 76       | 33    | 195              | 36       | 2,4   | 713              | 138      | 17,1  | 371              | 69       | 6,1   | 282 | 74 | 30,4 |
| Feb - 1 | 212              | 43       | 8     | 252              | 62       | 23    | 197              | 34       | 0     | 417              | 84       | 14    | 340              | 77       | 22    | 280              | 85       | 45    | 302              | 61       | 10,2  | 231              | 63       | 28,0  | 386              | 77       | 12,3  | 327 | 82 | 31,3 |
| Feb - 2 | 195              | 41       | 9     | 224              | 57       | 22    | 171              | 29       | 0     | 332              | 71       | 16    | 351              | 78       | 21    | 311              | 84       | 37    | 282              | 57       | 10,2  | 202              | 58       | 28,0  | 183              | 42       | 12,3  | 220 | 62 | 29,4 |
| Feb - 3 | 143              | 31       | 8     | 139              | 41       | 21    | 173              | 30       | 0     | 346              | 73       | 16    | 283              | 64       | 18    | 308              | 74       | 25    | 311              | 69       | 18,4  | 185              | 48       | 20,1  | 136              | 33       | 12,3  | 205 | 56 | 25,6 |
| Feb - 4 | 155              | 33       | 8     | 170              | 45       | 20    | 168              | 29       | 0     | 389              | 84       | 20    | 205              | 49       | 17    | 605              | 126      | 25    | 616              | 133      | 30,8  | 316              | 68       | 16,5  | 120              | 30       | 11,3  | 369 | 82 | 22,1 |
| Feb - 5 | 257              | 54       | 12    | 153              | 52       | 31    | 212              | 37       | 0     | 319              | 81       | 32    | 410              | 87       | 19    | 501              | 104      | 20    | 503              | 108      | 25,2  | 321              | 69       | 16,5  | 173              | 38       | 10,6  | 308 | 69 | 18,6 |
| Feb - 6 | 164              | 34       | 8     | 178              | 56       | 31    | 201              | 35       | 0     | 619              | 134      | 32    | 439              | 92       | 19    | 549              | 111      | 19    | 549              | 113      | 21,6  | 307              | 67       | 16,5  | 138              | 32       | 10,6  | 222 | 52 | 16,6 |
| Mar - 1 | 140              | 27       | 4     | 417              | 83       | 12    | 223              | 52       | 17    | 362              | 84       | 26    | 346              | 71       | 13    | 563              | 111      | 16    | 273              | 62       | 18,2  | 180              | 42       | 13,9  | 151              | 39       | 15,7  | 180 | 41 | 11,6 |
| Mar - 2 | 113              | 23       | 4     | 195              | 47       | 16    | 305              | 67       | 17    | 379              | 86       | 25    | 362              | 74       | 13    | 350              | 72       | 14    | 195              | 48       | 18,2  | 150              | 37       | 13,9  | 170              | 42       | 15,7  | 200 | 42 | 9,6  |
| Mar - 3 | 113              | 23       | 4     | 143              | 38       | 16    | 235              | 55       | 17    | 343              | 73       | 16    | 303              | 63       | 13    | 453              | 89       | 12    | 153              | 41       | 18,2  | 157              | 36       | 11,0  | 390              | 83       | 19,1  | 264 | 52 | 8,2  |
| Mar - 4 | 118              | 23       | 4     | 141              | 33       | 11    | 296              | 68       | 21    | 323              | 69       | 15    | 212              | 45       | 11    | 569              | 109      | 12    | 147              | 40       | 18,2  | 188              | 41       | 11,0  | 446              | 104      | 32,8  | 210 | 43 | 8,2  |
| Mar - 5 | 133              | 26       | 4     | 134              | 28       | 6     | 274              | 64       | 21    | 315              | 67       | 15    | 183              | 35       | 4     | 669              | 133      | 20    | 137              | 38       | 18,2  | 215              | 46       | 11,0  | 175              | 57       | 32,9  | 196 | 40 | 8,2  |
| Mar - 6 | 179              | 34       | 4     | 251              | 44       | 1     | 360              | 79       | 21    | 448              | 92       | 17    | 168              | 30       | 1     | 681              | 135      | 20    | 186              | 53       | 25,5  | 162              | 37       | 11,0  | 177              | 48       | 21,0  | 197 | 41 | 6,2  |
| Apr - 1 | 146              | 30       | 6     | 322              | 64       | 10    | 331              | 74       | 20    | 280              | 67       | 22    | 181              | 35       | 4     | 489              | 99       | 18    | 139              | 34       | 12,9  | 222              | 49       | 13,5  | 209              | 47       | 13,0  | 201 | 45 | 12,6 |
| Apr - 2 | 209              | 38       | 3     | 322              | 63       | 9     | 328              | 73       | 20    | 236              | 56       | 18    | 222              | 44       | 7     | 373              | 80       | 18    | 160              | 38       | 12,9  | 210              | 47       | 13,5  | 234              | 51       | 13,0  | 435 | 88 | 15,5 |
| Apr - 3 | 233              | 43       | 3     | 354              | 68       | 9     | 312              | 74       | 24    | 262              | 60       | 18    | 339              | 67       | 10    | 267              | 56       | 13    | 215              | 47       | 11,6  | 422              | 86       | 14,8  | 439              | 89       | 15,1  | 363 | 79 | 19,8 |
| Apr - 4 | 181              | 34       | 4     | 309              | 64       | 13    | 388              | 86       | 22    | 237              | 55       | 18    | 179              | 38       | 8     | 315              | 62       | 9     | 276              | 62       | 17,3  | 558              | 111      | 16,9  | 514              | 112      | 27,0  | 320 | 73 | 21,9 |
| Apr - 5 | 248              | 46       | 4     | 185              | 40       | 10    | 476              | 98       | 19    | 206              | 50       | 18    | 709              | 133      | 12    | 656              | 125      | 13    | 463              | 99       | 23,0  | 436              | 90       | 16,9  | 404              | 92       | 26,6  | 300 | 71 | 22,7 |
| Apr - 6 | 284              | 55       | 7     | 162              | 36       | 11    | 322              | 72       | 20    | 247              | 57       | 18    | 260              | 57       | 15    | 276              | 69       | 14    | 253              | 65       | 25,9  | 413              | 100      | 34,0  | 212              | 58       | 26,6  | 165 | 44 | 19,5 |
| May - 1 | 214              | 42       | 6     | 176              | 37       | 8     | 247              | 58       | 19    | 412              | 89       | 21    | 1054             | 207      | 27    | 295              | 64       | 15    | 265              | 59       | 16,1  | 339              | 72       | 15,9  | 165              | 43       | 17,9  | 180 | 42 | 13,0 |
| May - 2 | 181              | 35       | 5     | 210              | 43       | 8     | 407              | 86       | 19    | 302              | 73       | 26    | 5                |          |       |                  |          |       |                  |          |       |                  |          |       |                  |          |       |     |    |      |

**ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX III**

**Collaboration Agreement Between Directorate General of Water Resources and OKI  
District Government**

**PERJANJIAN KERJASAMA  
ANTARA  
DIREKTORAT JENDERAL SUMBER DAYA AIR  
DENGAN  
PEMERINTAH KABUPATEN OGAN KOMERING ILIR**

Nomor : 27/KPTS/D/2010      Tanggal 24 Februari 2010  
Nomor : 640/0131/VI/OKI/2010 Tanggal 24 Februari 2010

**TENTANG  
PENGEMBANGAN LAHAN PERTANIAN PANGAN BERKELANJUTAN  
PADA AREAL LEMPUING, DAERAH IRIGASI KOMERING.**

Dengan Rahmat Tuhan Yang Maha Esa dan didasari keinginan bersama untuk melaksanakan kegiatan pengembangan sistem irigasi dalam rangka pengembangan lahan pertanian pangan pada areal Lempuing dalam Daerah Irigasi Komering seluas ±13.500 ha pada Wilayah Sungai Musi yang terletak di Kabupaten Ogan Komering Ilir (OKI) Provinsi Sumatera Selatan, maka pada hari ini Rabu tanggal 24 bulan Februari tahun dua ribu sepuluh, yang bertanda tangan di bawah ini :

1. DR.Ir. Moch. Amron, M.Sc. Plt Direktur Jenderal Sumber Daya Air, yang diangkat berdasarkan Surat Perintah Menteri PU No. : 01/SPRIN/M/2010 Tanggal 19 Januari 2010 Jo. Keppres Nom :67/M/2009 tanggal 21 Juli 2009 dalam kedudukannya tersebut dalam hal ini untuk dan atas nama Kementerian Pekerjaan Umum yang berkedudukan di Jl. Pattimura No. 20 Kebayoran Baru, Jakarta Selatan selanjutnya dalam Perjanjian Kerjasama ini disebut PIHAK PERTAMA.
2. Ir. H. Ishak Mekki, MM. Bupati Ogan Komering Ilir (OKI) Provinsi Sumatera Selatan, yang diangkat berdasarkan SK MENDAGRI No. 131.16-994 Tahun 2008, tanggal 23 Desember 2008 dalam kedudukannya tersebut dalam hal ini bertindak untuk dan atas nama Pemerintahan Kabupaten/Kota Ogan Komering Ilir Provinsi Sumatera Selatan, yang berkedudukan di Kayuagung.
3. H. Yusuf Mekki, S.Sos, Ketua DPRD Kabupaten Ogan Komering Ilir Provinsi Sumatera Selatan, yang diangkat berdasarkan Keputusan Gubernur Sumsel No.688/KPTS/II/2009, dalam kedudukannya tersebut dalam hal ini bertindak untuk dan atas nama Pemerintahan Kabupaten/Kota Ogan Komering Ilir Provinsi Sumatera Selatan, yang berkedudukan di Kayuagung.

yang selanjutnya dalam Perjanjian Kerjasama ini Bupati Ogan Komering Ilir dan Ketua DPRD Kabupaten Ogan Komering Ilir disebut **PIHAK KEDUA**.

**PIHAK PERTAMA** dan **PIHAK KEDUA**, selanjutnya secara bersama-sama disebut **PARA PIHAK** terlebih dahulu menerangkan hal-hal sebagai berikut:

- a. bahwa **PIHAK PERTAMA** yang mempunyai tugas dan tanggung jawab dalam pengelolaan sumber daya air pada Wilayah Sungai Musi yang meliputi pengembangan dan pengelolaan sistem irigasi untuk mendukung program ketahanan pangan nasional;
- b. bahwa **PIHAK KEDUA** selaku peyelenggara urusan pemerintahan daerah dan unsur penyelenggaraan pemerintahan daerah;

Dengan memperhatikan peraturan perundang-undangan sebagai berikut:

1. Undang-undang Nomor 7 Tahun 2004 tentang Sumber Daya Air;
2. Undang-udang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah;
3. Undang-undang Nomor 26 Tahun 2007 tentang Penataan Ruang;
4. Undang-undang Nomor 41 Tahun 2009 tentang Perlindungan Lahan Pertanian Pangan Berkelanjutan;
5. Peraturan Pemerintah Nomor 20 Tahun 2006 tentang Irigasi; dan
6. Peraturan Pemerintah Nomor 50 Tahun 2007 tentang Tata Cara Pelaksanaan Kerja Sama Daerah.

**PARA PIHAK** melalui Perjanjian Kerjasama ini, sepakat untuk mengadakan kerjasama dalam rangka pengembangan dan pengelolaan sistem irigasi untuk mendukung program ketahanan pangan nasional, selanjutnya menyatakan beberapa hal sebagai berikut:

## BAB II

### MAKSUD DAN TUJUAN

#### Pasal 2

- (1) Perjanjian Kerjasama ini dimaksudkan untuk membangun komitmen bersama dalam mendukung program ketahanan pangan nasional dengan mendorong peningkatan produksi pangan melalui sawah beririgasi dan menetapkannya sebagai lahan pertanian pangan berkelanjutan pada areal Lempuing Daerah Irigasi Komering.

- (2) Perjanjian Kerjasama ini bertujuan untuk menjamin tersediannya lahan pertanian pangan berkelanjutan pada areal Lempuing Daerah Irigasi Komering seluas ±13.500 ha sebagai salah satu sumber utama produksi beras nasional untuk mendukung program ketahanan pangan nasional.

**BAB III**  
**RUANG LINGKUP**  
Pasal 3

Ruang lingkup Perjanjian Kerjasama ini meliputi wewenang, tugas dan tanggung jawab **PARA PIHAK** dalam pengembangan dan pengelolaan lahan pertanian pangan berkelanjutan pada areal Lempuing Daerah Irigasi Komering seluas ±13.500 ha, kondisi saat ini ini sawah tada hujan, terletak di Kabupaten Ogan Komering Ilir (OKI) Provinsi Sumatera Selatan.

**BAB IV**  
**WEWENANG, TUGAS DAN TANGGUNG JAWAB**  
Pasal 4

Pengembangan lahan pertanian pangan berkelanjutan

**(1) PIHAK PERTAMA:**

- a. Identifikasi areal tanah untuk ditetapkan sebagai lahan pertanian pangan berkelanjutan;
- b. Perencanaan pembangunan jaringan irigasi;
- c. Pembangunan jaringan irigasi;
- d. Penyediaan anggaran melalui APBN;
- e. Melakukan sosialisasi dan pembinaan kepada masyarakat petani.

**(2) PIHAK KEDUA:**

- a. Menjamin bahwa areal Lempuing, Daerah Irigasi Komering seluas ± 13.500 ha menjadi lahan pertanian berkelanjutan;
- b. Melakukan sosialisasi mengenai rencana pengembangan lahan pertanian pangan berkelanjutan kepada masyarakat;
- c. Penyiapan peraturan daerah tentang rencana pengembangan lahan pertanian pangan berkelanjutan;
- d. Bersama-sama dengan Pemerintah Propinsi melakukan pengadaan tanah untuk pembangunan jaringan irigasi;
- e. Pengamanan pengadaan tanah untuk pembangunan jaringan irigasi;
- f. Penyediaan anggaran melalui APBD

## Pasal 5

Pengelolaan lahan pertanian pangan berkelanjutan

(1) **PIHAK PERTAMA:**

- a. penyediaan air irigasi sesuai dengan pola tanam ;
- b. operasi jaringan irigasi;
- c. pemeliharaan jaringan irigasi; dan
- d. melakukan pembinaan kepada masyarakat tentang pengelolaan jaringan irigasi di tingkat tersier
- e. penyediaan anggaran melalui APBN.

(2) **PIHAK KEDUA:**

- a. menetapkan lahan pertanian pangan berkelanjutan dalam rencana tata ruang wilayah kabupaten;
- b. mempertahankan keberadaan lahan pertanian pangan berkelanjutan;
- c. penyusunan rencana pola tanam;
- d. membangun peran petani pemakai air dalam pelaksanaan operasi dan pemeliharaan jaringan irigasi; dan
- e. penyediaan anggaran melalui APBD.

## BAB V JANGKA WAKTU

### Pasal 6

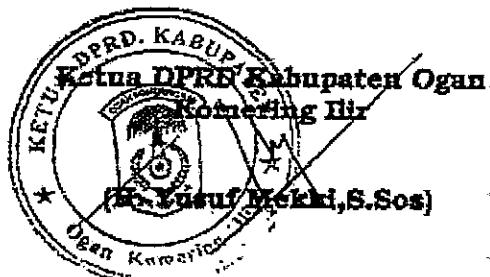
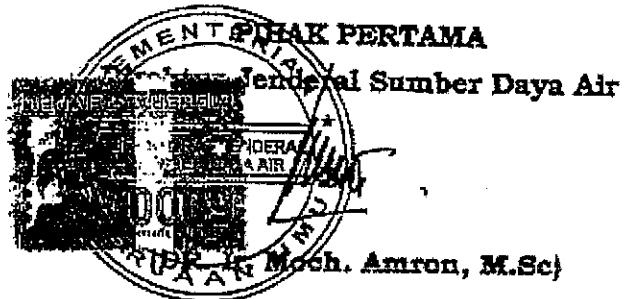
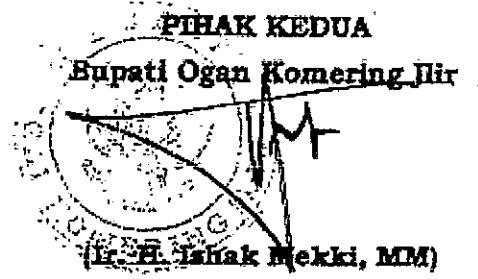
- (1) Perjanjian Kerjasama ini berlaku selama 25 (dua puluh lima) tahun terhitung sejak ditandatanganinya Perjanjian Kerjasama ini dan dapat diperpanjang sesuai dengan kebutuhan berdasarkan kesepakatan **PARA PIHAK**.
- (2) Tahapan kegiatan dan hal-hal lain yang belum diatur dalam Perjanjian Kerjasama ini akan diatur oleh **PARA PIHAK** sesuai dengan wewenang dan tanggung jawab masing-masing.

### Pasal 7

Apabila Perjanjian Kerjasama akan diperpanjang maka atas persetujuan **PARA PIHAK** dilakukan koordinasi paling lambat 3 (tiga) bulan sebelum masa berlaku berakhir.

BAB VI  
PENUTUP  
Pasal 8

Perjanjian Kerjasama ini dibuat rangkap 3 (tiga) bermaterai cukup, yang masing-masing mempunyai kekuatan hukum yang sama setelah ditandatangani oleh PARA PIHAK.



ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX IV**  
Activity Appropriateness with Space Allotment Plan of Province

## BANGKA STREATE

MAP  
AREA SPACE REGULATION PLANNING  
OF SUMATERA SELATAN PROVINCE  
2015 - 2019

### LEGEND :

- Province Capital
- District City
- District Boundary
- Province Boundary
- WS Muai Boundary
- River
- Lake

## JAMBI PROVINCE

- Primary Artery
- Primary Collector
- Local
- Plant of Primary Artery

- Planning Area of Tanjung Api-Api Road Strand
- Area of Industry
- Bush
- Irrigation Area
- Big Plantation
- Small Plantation
- Wetland Agriculture
- Marsh
- Byke
- Upland Agriculture
- Conversion Production Forest
- Fixed Production Forest
- National Service Forest
- Shelter Forest

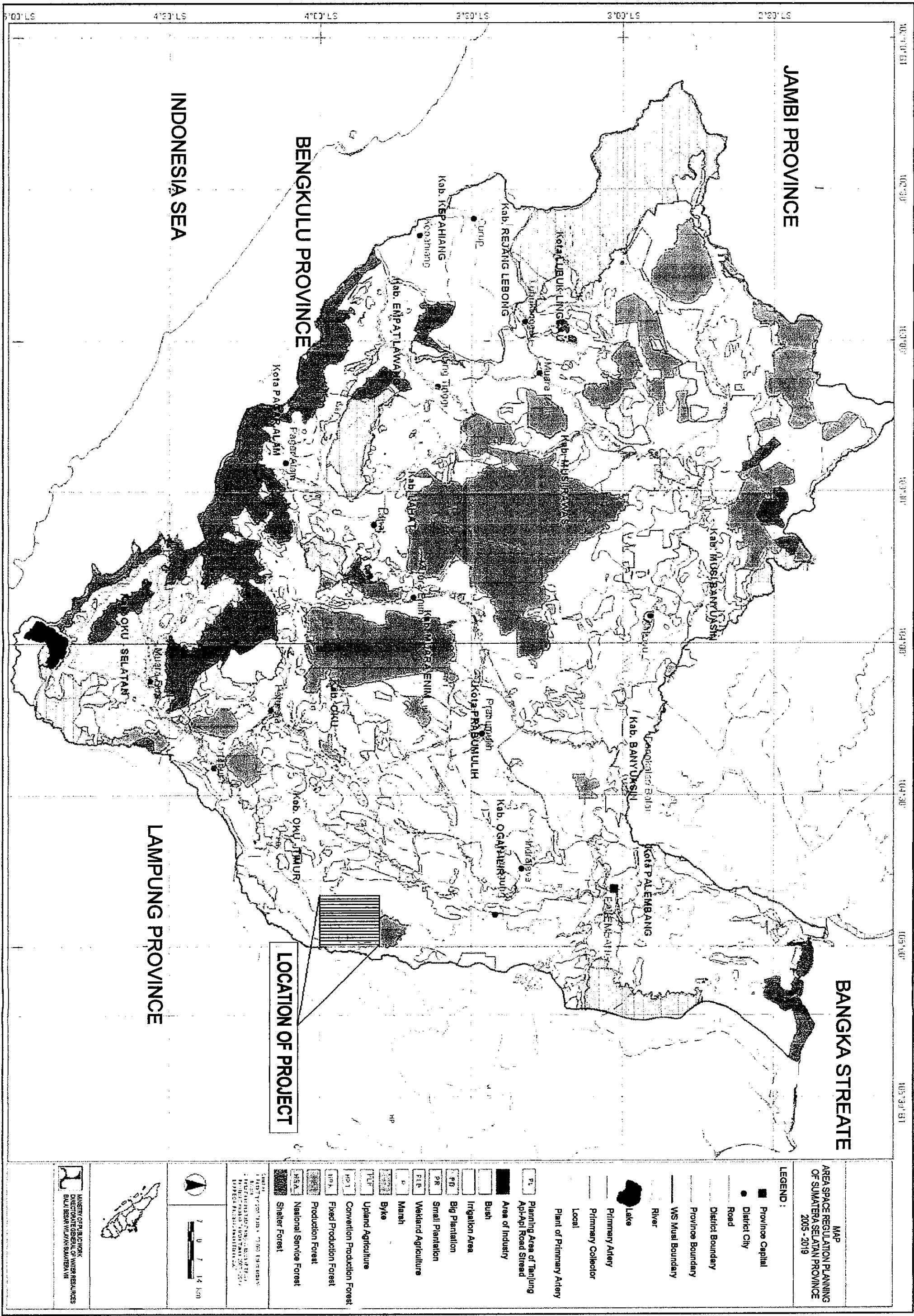
## BENGKULU PROVINCE

## INDONESIA SEA

## LAMPUNG PROVINCE



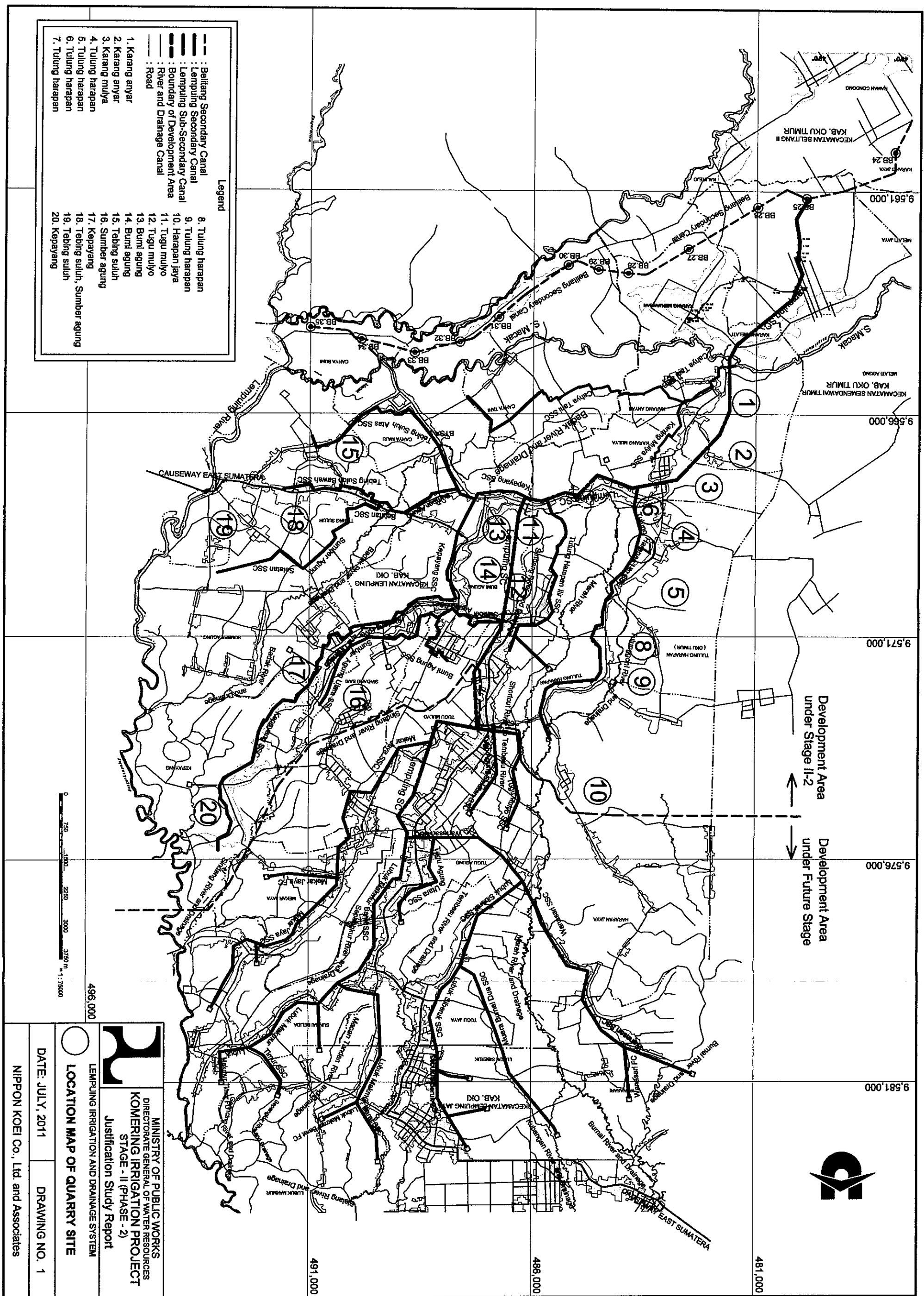
MINISTRY OF PUBLIC WORK  
DIRECTORATE GENERAL OF WATER RESOURCES  
BAJU BEAR WILAYAH SUMATERA VII



ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX V**  
Quarry Location Map



ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX VI**  
Document Signing of KA of Environmental Impact Assessment



## GUBERNUR SUMATERA SELATAN

### KEPUTUSAN GUBERNUR SUMATERA SELATAN NOMOR : 774/ KPTS / BAN.LH / 2011

#### TENTANG

KESEPAKATAN KERANGKA ACUAN  
ANALISIS DAMPAK LINGKUNGAN HIDUP (KA-ANDAL)  
RENCANA PEMBANGUNAN SALURAN SEKUNDER DAN SUB SEKUNDER  
PADA AREA IRIGASI LEMPUING SELUAS ± 13.500 HEKTAR DI KABUPATEN OKU TIMUR  
DAN KABUPATEN OGAN KOMERING ILIR OLEH BALAI BESAR WILAYAH SUNGAI VIII  
DIREKTORAT JENDERAL SUMBER DAYA AIR KEMENTERIAN PEKERJAAN UMUM

#### GUBERNUR SUMATERA SELATAN,

- Menimbang :
- a. bahwa rencana pembangunan saluran sekunder dan sub sekunder pada area irigasi Lempuing seluas ± 13.500 Hektar di Kecamatan Semendawai Timur Kabupaten OKU Timur serta Kecamatan Lempuing dan Lempuing Jaya Kabupaten Ogan Komering Ilir merupakan usaha dan/atau kegiatan yang wajib dilengkapi dengan Studi Analisis Mengenai Dampak Lingkungan Hidup;
  - b. bahwa berdasarkan hasil rapat penilaian oleh Komisi Penilai AMDAL Provinsi Sumatera Selatan tanggal 20 Juli 2011 telah disetujui Kerangka Acuan Analisis Dampak Lingkungan Hidup Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar di Kecamatan Semendawai Timur Kabupaten OKU Timur serta Kecamatan Lempuing dan Lempuing Jaya Kabupaten Ogan Komering Ilir oleh Balai Besar Wilayah Sungai VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum;
  - c. bahwa berdasarkan ketentuan Pasal 29 ayat (1) huruf b Peraturan Menteri Negara Lingkungan Hidup Nomor 5 Tahun 2008 tentang Tata Kerja Komisi Penilai AMDAL, Keputusan Kesepakatan Kerangka Acuan diterbitkan oleh Gubernur untuk dokumen yang telah dinilai oleh Komisi Penilai Provinsi;
  - d. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a, huruf b dan huruf c, perlu menetapkan Keputusan Gubernur tentang Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL) Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar di Kabupaten OKU Timur dan Kabupaten Ogan Komering Ilir oleh Balai Besar Wilayah Sungai VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum;

- Mengingat : 1. Undang-Undang Nomor 25 Tahun 1959 tentang Pembentukan Daerah Tingkat I Sumatera Selatan (Lembaran Negara Republik Indonesia Tahun 1959 Nomor 70, Tambahan Lembaran Negara Republik Indonesia Nomor 1814);
2. Undang-Undang Nomor 5 Tahun 1990 tentang Konservasi Sumber Daya Alam Hayati dan Ekosistemnya (Lembaran Negara Republik Indonesia Tahun 1990 Nomor 49, Tambahan Lembaran Negara Republik Indonesia Nomor 3419);
3. Undang-Undang Nomor 7 Tahun 2004 tentang Sumber Daya Air (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 32, Tambahan Lembaran Negara Republik Indonesia Nomor 4377);
4. Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2004 Nomor 125, Tambahan Lembaran Negara Republik Indonesia Nomor 4437) sebagaimana telah beberapa kali diubah, terakhir dengan Undang-Undang Nomor 12 Tahun 2008 tentang Perubahan Kedua atas Undang-Undang Nomor 32 Tahun 2004 tentang Pemerintahan Daerah (Lembaran Negara Republik Indonesia Tahun 2008 Nomor 59, Tambahan Lembaran Negara Republik Indonesia Nomor 4844);
5. Undang-Undang Nomor 26 Tahun 2007 tentang Penataan Ruang (Lembaran Negara Republik Indonesia Tahun 2007 Nomor 68, Tambahan Lembaran Negara Republik Indonesia Nomor 4725);
6. Undang-Undang Nomor 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 140, Tambahan Lembaran Negara Republik Indonesia Nomor 5059);
7. Peraturan Pemerintah Nomor 27 Tahun 1999 tentang Analisis Mengenai Dampak Lingkungan Hidup (Lembaran Negara Republik Indonesia Tahun 1999 Nomor 59, Tambahan Lembaran Negara Republik Indonesia Nomor 3838);
8. Peraturan Pemerintah Nomor 20 Tahun 2006 tentang Irigasi (Lembaran Negara Republik Indonesia Tahun 2006 Nomor 46, Tambahan Lembaran Negara Republik Indonesia Nomor 4624);
9. Peraturan Pemerintah Nomor 38 Tahun 2007 tentang Pembagian Urusan Pemerintahan antara Pemerintah, Pemerintahan Daerah Provinsi, dan Pemerintahan Daerah Kabupaten/Kota (Lembaran Negara Republik Indonesia Tahun 2007 Nomor 82, Tambahan Lembaran Negara Republik Indonesia Nomor 4737);

10. Peraturan Menteri Negara Lingkungan Hidup Nomor 5 Tahun 2008 tentang Tata Kerja Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup;
11. Peraturan Daerah Provinsi Sumatera Selatan Nomor 9 Tahun 2008 tentang Organisasi dan Tata Kerja Inspektorat, Badan Perencanaan Pembangunan Daerah dan Lembaga Teknis Daerah Provinsi Sumatera Selatan (Lembaran Daerah Tahun 2008 Nomor 3 Seri D) sebagaimana telah beberapa kali diubah, terakhir dengan Peraturan Daerah Nomor 2 Tahun 2011 tentang Perubahan Kedua atas Peraturan Daerah Nomor 9 Tahun 2008 tentang Organisasi dan Tata Kerja Inspektorat, Badan Perencanaan Pembangunan Daerah dan Lembaga Teknis Daerah Provinsi Sumatera Selatan (Lembaran Daerah Tahun 2011 Nomor 2 Seri D);
12. Keputusan Gubernur Sumatera Selatan Nomor 629/KPTS/BAN.LH/2010 tentang Pembentukan Komisi Penilai, Tim Teknis dan Sekretariat Komisi Penilai Analisis Mengenai Dampak Lingkungan Hidup (AMDAL) Provinsi Sumatera Selatan;

**MEMUTUSKAN :**

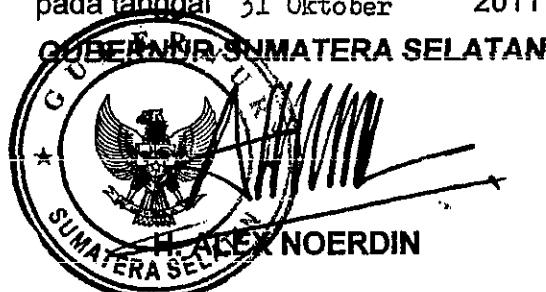
Menetapkan :

- KESATU : Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup (KA-ANDAL) Rencana Pembangunan Saluran Sekunder dan Sub Sekunder pada Area Irigasi Lempuing Seluas ± 13.500 Hektar di Kecamatan Semendawai Timur Kabupaten OKU Timur serta Kecamatan Lempuing dan Lempuing Jaya Kabupaten Ogan Komering Ilir oleh Balai Besar Wilayah Sungai VIII Direktorat Jenderal Sumber Daya Air Kementerian Pekerjaan Umum.
- KEDUA : Ruang lingkup dan kedalaman studi KA-ANDAL sebagaimana dimaksud pada Diktum Kesatu adalah tercantum dalam Dokumen Kerangka Acuan Analisis Dampak Lingkungan Hidup dan wajib digunakan sebagai acuan Studi Analisis Dampak Lingkungan Hidup selanjutnya.
- KETIGA : Langkah-langkah kegiatan fisik pada Rencana Pembangunan Saluran Sekunder dan Sub Sekunder sebagaimana dimaksud pada Diktum Kesatu tidak dibenarkan untuk dilakukan sampai diterbitkannya Keputusan Kelayakan Lingkungan Hidup berdasarkan hasil Analisis Dampak Lingkungan Hidup, Rencana Pengelolaan Lingkungan Hidup dan Rencana Pemantauan Lingkungan Hidup.

**KEEMPAT** : Setiap kelalaian dan/atau penyimpangan yang dilakukan oleh Balai Besar Wilayah Sungai VIII pada kegiatan pembangunan saluran sekunder dan sub sekunder pada area Irigasi Lempuing seluas ± 13.500 Hektar di Kecamatan Semendawai Timur Kabupaten Ogan Komering Ulu Timur serta Kecamatan Lempuing dan Lempuing Jaya Kabupaten Ogan Komering Ilir dikenakan sanksi sesuai dengan peraturan perundang-undangan yang berlaku.

**KELIMA** : Keputusan ini mulai berlaku pada tanggal ditetapkan dengan ketentuan bahwa segala sesuatunya akan diubah dan diperbaiki kembali sebagaimana mestinya apabila di kemudian hari ternyata terdapat kekeliruan dalam Keputusan ini.

Ditetapkan di Palembang  
pada tanggal 31 Oktober 2011  
**GUBERNUR SUMATERA SELATAN,**



Tembusan :

1. Menteri Dalam Negeri RI di Jakarta
2. Menteri Pekerjaan Umum RI di Jakarta
3. Menteri Negara Lingkungan Hidup RI di Jakarta
4. Dirjend Sumber Daya Air Kementerian Pekerjaan Umum RI di Jakarta
5. Bupati OKU Timur di Martapura
6. Bupati Ogan Komering Ilir di Kayuagung
7. Kepala Dinas PU Pengairan Provinsi Sumsel di Palembang
8. Kepala Badan Lingkungan Hidup Provinsi Sumsel di Palembang
9. Kepala Balai Besar Wilayah Sungai VIII Kementerian Pekerjaan Umum RI di Palembang

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX VII**  
Certificate of Laboratory Test Result



KEMENTERIAN PENDIDIKAN NASIONAL,  
UNIVERSITAS SRIWIJAYA  
FAKULTAS PERTANIAN  
JURUSAN TANAH

Jl. Raya Palembang-Prabumulih Km.32 Indralaya, Ogan Ilir Kode Pos 30662  
Telp. 0711-580460, Fax: 0711-580460, e-mail : ilmutanah.unsri@yahoo.co.id

**LABORATORIUM FISIKA DAN KONSERVASI TANAH**

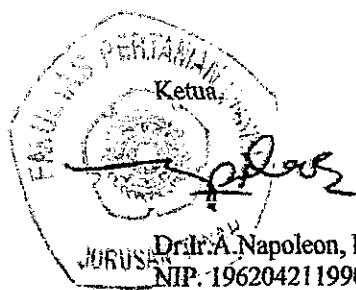
No. 212a /U/Lab/TNH/VIII/2011

Pengirim : BBWSS VII  
Contoh : Tanah  
Jumlah : 7 sampel  
Lokasi : Wilayah Lempuing  
Tanggal Pengiriman : Juli 2011

| Kode | Permeabilitas (cm/jam) | Bobot Isi (g/cm <sup>3</sup> ) | Porositas (%) | Kadar Air (%) | Struktur       | Warna      |
|------|------------------------|--------------------------------|---------------|---------------|----------------|------------|
| T-1  | 12,212 c               | 0,97 s                         | 27,82         | 41            | Agak Gumpal    | 7,5 YR 4/4 |
| T-2  | 10,7111 c              | 0,97 s                         | 46,77         | 43            | Granular halus | 7,5 YR 4/4 |
| T-3  | 4,461 al               | 1,11 s                         | 46,67         | 33            | Agak Gumpal    | 7,5 YR 4/3 |
| T-4  | 6,712 al               | 2,14 s                         | 31,14         | 41            | Granular       | 7,5 YR 4/3 |
| T-5  | 4,771 al               | 1,12 s                         | 39,14         | 38            | Granular       | 7,5 YR 4/4 |
| T-6  | 7,111 al               | 1,09 s                         | 32,14         | 40            | Granular halus | 7,5 YR 4/4 |
| T-7  | 6,781 al               | 1,34 s                         | 29,14         | 37            | Agak Gumpal    | 7,5 YR 4/3 |

Keterangan :

Kriteria : c = cepat; al = agak lambat; s = sedang

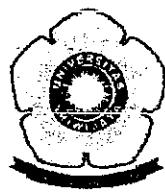


Dr.Ir. A.Napoleon, MP  
NIP. 196204211990031002

Indralaya, Agustus 2011

Kepala Laboratorium,

Dr.Ir. Siti Maserah Bernas, M.Sc.  
NIP. 195612301985032001



**KEMENTERIAN PENDIDIKAN NASIONAL  
UNIVERSITAS SRIWIJAYA  
FAKULTAS PERTANIAN  
JURUSAN TANAH**

Jl. Raya Palembang-Prabumulih Km.32 Indralaya, Ogan Ilir Kode Pos 30662  
Telp. 0711-580460, Fax: 0711-580460, e-mail : ilmutanah.unsri@yahoo.co.id

**LABORATORIUM KIMIA, BIOLOGI DAN KESUBURAN TANAH**

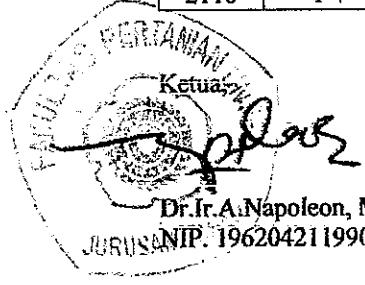
No. 212 /U/Lab/TNH/VIII/2011

Pengirim : BBWSS VII  
Contoh : Tanah  
Jumlah : 7 sampel  
Lokasi : Wilayah Lempuing  
Tanggal Pengiriman : Juli 2011

| No.  | Kode | pH               |      | (%)       |         | P-Bray I (ppm) |
|------|------|------------------|------|-----------|---------|----------------|
|      |      | H <sub>2</sub> O | KCl  | C-Organik | N-total |                |
| 2112 | T-1  | 4,63             | 3,48 | 2,13      | 0,12    | 1,70           |
| 2113 | T-2  | 4,34             | 3,23 | 1,17      | 0,11    | 4,20           |
| 2114 | T-3  | 4,24             | 3,04 | 2,86      | 0,21    | 4,14           |
| 2115 | T-4  | 4,73             | 3,58 | 2,43      | 0,18    | 1,80           |
| 2116 | T-5  | 4,56             | 3,46 | 1,18      | 0,10    | 3,30           |
| 2117 | T-6  | 4,54             | 3,44 | 3,46      | 0,26    | 4,95           |
| 2118 | T-7  | 4,54             | 3,44 | 3,46      | 0,26    | 4,95           |

| No.  | Kode | (me/100g) |      |      |      |       |       |      |
|------|------|-----------|------|------|------|-------|-------|------|
|      |      | K-dd      | Na   | Ca   | Mg   | KTK   | Al-dd | H-dd |
| 2112 | T-1  | 0,14      | 0,45 | 0,34 | 0,15 | 17,18 | 2,11  | 0,76 |
| 2113 | T-2  | 0,16      | 0,41 | 0,31 | 0,07 | 16,05 | 2,48  | 0,82 |
| 2114 | T-3  | 0,14      | 0,23 | 0,31 | 0,13 | 16,37 | 2,81  | 0,77 |
| 2115 | T-4  | 0,19      | 0,55 | 0,38 | 0,17 | 18,88 | 2,20  | 0,82 |
| 2116 | T-5  | 0,15      | 0,44 | 0,30 | 0,08 | 19,05 | 3,04  | 0,72 |
| 2117 | T-6  | 0,18      | 0,32 | 0,36 | 0,12 | 17,41 | 2,88  | 0,76 |
| 2118 | T-7  | 0,19      | 0,33 | 0,33 | 0,12 | 17,40 | 2,88  | 0,76 |

| No.  | Kode | Kej. Basa (%) | Kej. Al (%) | Tekstur (%) |       |       |
|------|------|---------------|-------------|-------------|-------|-------|
|      |      |               |             | Pasir       | Debu  | Liat  |
| 2112 | T-1  | 19,450        | 14,458      | 22,13       | 51,89 | 25,98 |
| 2113 | T-2  | 18,670        | 18,390      | 21,30       | 44,49 | 34,21 |
| 2114 | T-3  | 18,260        | 21,29       | 33,36       | 47,94 | 18,70 |
| 2115 | T-4  | 20,604        | 15,658      | 19,13       | 52,89 | 27,98 |
| 2116 | T-5  | 20,417        | 20,177      | 23,40       | 42,39 | 34,21 |
| 2117 | T-6  | 20,263        | 20,239      | 34,16       | 47,92 | 17,92 |
| 2118 | T-7  | 21,264        | 20,239      | 20,30       | 43,49 | 36,21 |



Dr. Ir. A. Napoleon, MP.  
JURUSAN TANAH  
NIP. 196204211990031002

Indralaya, Agustus 2011

Kepala Laboratorium

Prof. Dr. Dedik Budianta, M.Sc.  
NIP. 196306141989031003

Catatan : Surat tanda uji ini berlaku 120 hari sejak tanggal dikeluarkan



**KEMENTERIAN PENDIDIKAN NASIONAL  
UNIVERSITAS SRIWIJAYA  
PUSAT PENELITIAN LINGKUNGAN HIDUP  
LEMBAGA PENELITIAN**

Gedung Perpustakaan Kampus Indralaya (Ol) 30662  
Jalan Raya Palembang Km 32 Ogan Ilir Sumsel Telp. (0711) 580640.

|                         |   |   |
|-------------------------|---|---|
| <b>Hasil Analisis</b>   | : | Biota Perairan (Plankton)                     |
| <b>Pengirim Sampel</b>  | : | BBSSWS VII                                    |
| <b>Lokasi Sampling</b>  | : | Perairan Sekitar Lokasi Kegiatan<br>OKI Timur |
| <b>Tanggal Sampling</b> | : | 13-14 Mei 2011                                |
| <b>Nomor Uji</b>        | : | 306/Lab-PPLH/IV/2011-BBWSS                    |

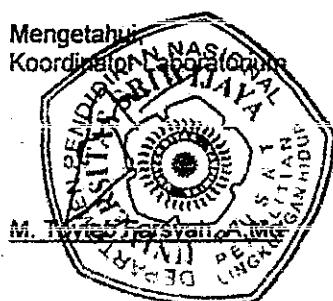
| Taksa/Jenis               | Lokasi Sampling              |                            |                              |                            |                              |
|---------------------------|------------------------------|----------------------------|------------------------------|----------------------------|------------------------------|
|                           | B1                           | B2                         | B3                           | B4                         | B5                           |
| Lempuing Hulu             | 03°54'35,9"-<br>104°56'36,7" | 03°47'52"-<br>104°56'46,2" | 03°56'10,9"-<br>104°49'23,7" | 03°56'14,4"-<br>104°54'25" | 03°53'06,5"-<br>104°52'49,3" |
| <b>PHYTOPLANKTON</b>      |                              |                            |                              |                            |                              |
| <i>Chlorophyceae</i>      |                              |                            |                              |                            |                              |
| <i>Closterium sp.</i>     | 4                            | 8                          | 12                           | 8                          | -                            |
| <i>Coemarium sp.</i>      | 16                           | 5                          | -                            | -                          | 3                            |
| <i>Ankistrodesmus sp.</i> | 4                            | -                          | -                            | 4                          | -                            |
| <i>Ulothrix sp.</i>       | 12                           | 8                          | 2                            | 4                          | 3                            |
| <i>Scenedesmus sp.</i>    | 6                            | 2                          | 4                            | 2                          | -                            |
| <i>Oedogonium sp.</i>     | 2                            | -                          | 2                            | -                          | -                            |
| <i>Micrasterias sp.</i>   | -                            | 2                          | -                            | 2                          | -                            |
| <i>Bacillariophyceae</i>  |                              |                            |                              |                            |                              |
| <i>Achnanthes sp.</i>     | 12                           | 8                          | 4                            | 8                          | 2                            |
| <i>Gomphonema sp.</i>     | 4                            | 6                          | -                            | -                          | 4                            |
| <i>Cymbella sp.</i>       | -                            | -                          | -                            | 2                          | -                            |
| <i>Cyclotella sp.</i>     | 2                            | -                          | 2                            | -                          | 4                            |
| <i>Synedra sp.</i>        | 8                            | 6                          | 6                            | -                          | 6                            |
| <i>Coscinodiscus sp.</i>  | -                            | 12                         | 2                            | 6                          | -                            |
| <i>Pinnularia sp.</i>     | 4                            | -                          | 6                            | 2                          | -                            |
| <i>Navicula sp.</i>       | 12                           | 4                          | 6                            | -                          | 4                            |
| <i>Nitzchia sp.</i>       | 8                            | -                          | 12                           | 6                          | 6                            |
| <i>Cyanophyceae</i>       |                              |                            |                              |                            |                              |
| <i>Oscillatoria sp.</i>   | 6                            | 10                         | -                            | -                          | 4                            |
| <i>Lingbya sp.</i>        | -                            | -                          | 2                            | 2                          | -                            |
| <i>Spirulina sp.</i>      | 2                            | -                          | -                            | -                          | -                            |
| <i>Microscystis sp.</i>   | 6                            | 14                         | -                            | 4                          | 6                            |
| <b>ZOOPLANKTON</b>        |                              |                            |                              |                            |                              |
| <i>Phacus sp.</i>         | -                            | 2                          | 4                            | 2                          | 6                            |
| <i>Arcella sp.</i>        | 4                            | 2                          | -                            | -                          | 2                            |
| <i>Cyclops sp.</i>        | 2                            | 6                          | 6                            | 6                          | -                            |
| <i>Dillugia sp.</i>       | -                            | -                          | -                            | -                          | 4                            |
| <i>Nauplius sp.</i>       | 2                            | 2                          | 1                            | -                          | 2                            |
| Total jenis               | 19                           | 16                         | 15                           | 14                         | 14                           |

Sumber : Data Primer, 2011

Indralaya, 12 Mei 2011

Analisis,

Afif Barokah, S.Si





KEMENTERIAN PENDIDIKAN NASIONAL  
UNIVERSITAS SRIWIJAYA  
**PUSAT PENELITIAN LINGKUNGAN HIDUP**  
**LEMBAGA PENELITIAN**

Gedung Perpustakaan Kampus Indralaya (O) 30662  
Jalan Raya Palembang Km.32 Ogan Ilir Sumsel Telp. (0711) 580640.

**Hasil Analisis**  
**Pengirim Sampel**  
**Lokasi Sampling**

: Biota Perairan (Nekton)  
: BBSSWS VII  
: Perairan Sekitar Lokasi Kegiatan  
OKI Timur  
: 13-14 Mei 2011  
: 308/Lab-PPLH/IV/2011-BBWSS

**Tanggal Sampling**  
**Nomor Uji**

| No. | Spesies                            | Nama Lokal    | Kelimpahan |
|-----|------------------------------------|---------------|------------|
| 1   | <i>Acanthopsis choirorchinchus</i> | Julung-julung | +++        |
| 2   | <i>Anabas testudineus</i>          | Betok         | +++        |
| 3   | <i>Bagroides melapterus</i>        | Baung munti   | +          |
| 4   | <i>Belodontychys dinema</i>        | Sengarat      | +          |
| 5   | <i>Belontia hasselti</i>           | Selincah      | ++         |
| 6   | <i>Eleutheronema tridactylum</i>   | Senangin      | +          |
| 7   | <i>Gymnothorax tile</i>            | Belut         | +          |
| 8   | <i>Pangasius polyuranodon</i>      | Juaro         | ++         |
| 9   | <i>Macrones nemurus</i>            | Baung         | ++         |
| 10  | <i>Notopterus notopterus</i>       | Putak         | +          |
| 11  | <i>Ophiocephalus striatus</i>      | Gabus         | +++        |
| 12  | <i>Rasbora agyrotaenia</i>         | Seluang       | +++        |
| 13  | <i>Cryptopterus sp.</i>            | Lais          | ++         |
| 14  | <i>Clarias batracus</i>            | Lele          | ++         |
| 15  | <i>Helicophagus typus</i>          | Patin         | ++         |
| 16  | <i>Trichogaster sp.</i>            | Sepat siam    | +++        |
| 17  | <i>Ophiocephalus micropeltes</i>   | Toman         | +          |

Sumber : Data Pengamatan lapangan dan wawancara. 2011

Indralaya, 22 Mei 2011

Mengetahui,  
Koordinator Laboratorium

M. Toyiba Karayah, A.Md

Analis,

Afif Barokah, S.Si



**KEMENTERIAN PENDIDIKAN NASIONAL**  
**UNIVERSITAS SRIWIJAYA**  
**PUSAT PENELITIAN LINGKUNGAN HIDUP**  
**LEMBAGA PENELITIAN**

Gedung Perpustakaan Kampus Indralaya (OI) 30662  
 Jalan Raya Palembang Km.32 Ogan Ilir Sumsel Telp. (0711) 580640.

|                         |   |                                  |
|-------------------------|---|----------------------------------|
| <b>Hasil Analisis</b>   | : | Biota Perairan (Makrozoobenthos) |
| <b>Pengirim Sampel</b>  | : | BBSSWS VII                       |
| <b>Lokasi Sampling</b>  | : | Perairan Sekitar Lokasi Kegiatan |
| <b>Tanggal Sampling</b> | : | OKI Timur                        |
| <b>Nomor Uji</b>        | : | 13-14 Mei 2011                   |
|                         | : | 307/Lab-PPLH/IV/2011-BBWSS       |

| Taksa/Jenis        | Lokasi Sampling |              |             |              |    |
|--------------------|-----------------|--------------|-------------|--------------|----|
|                    | B1              | B2           | B3          | B4           | B5 |
| Lempuing Hulu      | Lempuing Hilir  | Macak Hulu   | Macak Hilir | Air Sindang  |    |
| 03°54'35,9"        | 03°47'52"-      | 03°56'10,9"  | 03°56'14,4" | 03°53'06,5"  |    |
| 104°56'36,1"       | 104°56'46,2"    | 104°49'43,7" | 104°54'25"  | 104°52'49,3" |    |
| <b>ANNELIDA</b>    |                 |              |             |              |    |
| Annelida spp.      | 12              | 4            | 12          | 14           | 6  |
| <b>OLIGOCHAETA</b> |                 |              |             |              |    |
| Limnodrilus sp.    | 6               | 8            | 8           | 10           | 4  |
| <b>DIPTERA</b>     |                 |              |             |              |    |
| Chironomidae       | 5               | -            | 4           | 4            | -  |
| Polypedilum sp.    |                 | 2            |             |              | 3  |
| Thienemanimya sp.  | 4               | -            | 2           | -            | -  |
| <b>MOLLUSCA</b>    |                 |              |             |              |    |
| Musculium sp.      | 4               | -            | 2           | 2            | 6  |
| Jumlah Jenis       | 5               | 3            | 5           | 4            | 4  |

Sumber : Data Primer, 2011

Indralaya, 22 Mei 2011

Mengetahui,  
 Koordinator Laboratorium



M. Tomyed Parsyane A.Md

Analisis,

Affif Barokah, S.Si



**KEMENTERIAN KESEHATAN**  
**DIREKTORAT JENDERAL PENGENDALIAN PENYAKIT**  
**DAN PENYEHATAN LINGKUNGAN**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN**  
**DAN PEMBERANTASAN PENYAKIT MENULAR KELAS I**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

Telp./Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**  
**IR.02.02/IX.8/244/11**

**UMUM**

|                            |   |
|----------------------------|---|
| No. Urut                   | : 235                                       |
| Laboratorium               | : Kimia Udara                               |
| Jenis Sampel               | : Udara Ambient                             |
| Asal Sampel                | : BBWSS VII                                 |
| Lokasi Sampel              | : Desa Tugu Mulyo                           |
| Diambil oleh               | : Staf BBWSS VII                            |
| Diambil/Diterima tanggal   | (Pengambilan Sampel Tanggungjawab Konsumen) |
| Jam Pengukuran/Pengambilan | : 13 Mei 2011 / 18 Mei 2011                 |
| Tanggal Pengujian di Lab.  | : 09.33 WIB                                 |
| No. Lab                    | : 1775/S-U/V/2011                           |
|                            | : 18 Mei 2011                               |

**HASIL UJI**

| No.                 | Parameter                            | Satuan                      | Batas Maksimum yang Diperbolehkan | Hasil  | Metode Pemeriksaan                                     | Titik Ordinat |
|---------------------|--------------------------------------|-----------------------------|-----------------------------------|--------|--|---------------|
| <b>I. FISIKA</b>    |                                      |                             |                                   |        |  |               |
| 1                   | Suhu                                 | °C                          | **                                | 29,2   | ASTM Standards 1977 (E337)                             |               |
| 2                   | Klembaban                            | %RH                         | **                                | 31,2   | ASTM Standards 1977 (E337)                             |               |
| 3                   | Arah angin                           | #                           | **                                | -      |  |               |
| 4                   | Kec. Angin                           | Fit/mnt                     | **                                | -      |  |               |
| 5                   | Kebisingan <sup>1)</sup>             | dBA                         | 55                                | 55,2   |  |               |
| <b>II. KIMIA 1</b>  |                                      |                             |                                   |        |  |               |
| 1                   | Hidrogen Sulfida (H <sub>2</sub> S)  | ppm                         | 0,02                              | 0,0026 | The Analysis of Air Pollutants, W Leithe 19715.5 (143) |               |
| 2                   | Amoniak (NH <sub>3</sub> )           | ppm                         | 2,0                               | -      | SNI 19 - 7119.1 - 2005                                 |               |
| <b>III. KIMIA 2</b> |                                      |                             |                                   |        |  |               |
| 1                   | Sulfur Dioksida (SO <sub>2</sub> )   | µg/Nm <sup>3</sup> /1 jam   | 900                               | 107,16 | SNI 19 - 7119.7 - 2005                                 |               |
| 2                   | Karbon Monoksida (CO)                | µg/Nm <sup>3</sup> /1 jam   | 30000                             | -      | NDIR   |               |
| 3                   | Nitrogen Dioksida (NO <sub>2</sub> ) | µg/Nm <sup>3</sup> /1 jam   | 400                               | 50,60  | SNI 19 - 7119.2 - 2005                                 |               |
| 4                   | TSP                                  | µg /Nm <sup>3</sup> /24 jam | 230                               | -      | SNI 19 - 7119.3 - 2005                                 |               |
| 5                   | Timbal (Pb)                          | µg /Nm <sup>3</sup> /24 jam | 2                                 | -      | SNI 19 - 7119.4 - 2005                                 |               |
| 6                   | Hidrokarbon (HC)                     | µg /Nm <sup>3</sup> /24 jam | 160                               | -      | Flame Ionization Detector (FID)                        |               |
| 7                   | PM <sub>10</sub>                     | µg /Nm <sup>3</sup> /24 jam | 150                               | -      |  |               |
| 8                   | PM <sub>2,5</sub>                    | µg /Nm <sup>3</sup> /24 jam | 65                                | -      |  |               |
| 9                   | Oksidan (O <sub>3</sub> )            | µg/Nm <sup>3</sup> /1 jam   | 235                               | -      | SNI 19 - 7119.8 - 2005                                 |               |

**Keterangan:**

- \*\*) Tidak diperlakukan
- #) Tidak ada satuan
- ) Tidak diperiksa (tidak diminta)

<sup>1)</sup> Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005 tentang Nilai Ambang Batas Kebisingan Untuk Perumahan & Pemukiman 55 dBA

(Batas Toleransi + 3 dB/A)

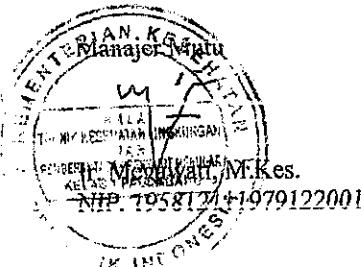
KIMIA 1 : Berdasar Kep.Men. KLH No. 50 Th. 1996

KIMIA 2 : Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005

Palembang, 31 Mei 2011

Manajer Teknis Kimia Udara

Siti Fatimah ST, MKM  
NIP. 197507121998032003





**KEMENTERIAN KESEHATAN**  
**DIREKTORAT JENDERAL PENGENDALIAN PENYAKIT**  
**DAN PENYEHATAN LINGKUNGAN**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN**  
**DAN PEMBERANTASAN PENYAKIT MENULAR KELAS I**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

Telp./Fax. 0711 - 351278

**SERTIFIKAT HASIL PENGUJIAN**  
**IR.02.02/IX.8/ 244 /11**

**UMUM**

No. Urut : 235  
 Laboratorium : Kimia Udara  
 Jenis Sampel : Udara Ambient  
 Asal Sampel : BBWSS VII  
 Lokasi Sampel : Desa Sungai Belida  
 Diambil oleh : Staf BBWSS VII  
 (Pengambilan Sampel Tanggungjawab Konsumen)  
 Diambil/Diterima tanggal : 14 Mei 2011 / 18 Mei 2011  
 Jam Pengukuran/Pengambilan : 08.50 WIB  
 Tanggal Pengujian di Lab. : 18 Mei 2011  
 No. Lab : 1778/S-U/V/2011

**HASIL UJI**

| No.                 | Parameter                            | Satuan                     | Batas<br>Maksimum<br>yang<br>Diperbolehkan | Hasil  | Metode<br>Pemeriksaan                                     | Titik<br>Ordinat |
|---------------------|--------------------------------------|----------------------------|--|--------|---|------------------|
| <b>I. FISIKA</b>    |                                      |                            |  |        |   |                  |
| 1                   | Suhu                                 | °C                         | **   | 28,2   | ASTM Standard 1977 (E337)                                 |                  |
| 2                   | Kelembaban                           | %RH                        | **   | 77,5   | ASTM Standards 1977 (E337)                                |                  |
| 3                   | Arah angin                           | #                          | **   | -      |   |                  |
| 4                   | Kec. Angin                           | Ft/mnt                     | **   | -      |   |                  |
| 5                   | Kebisingan <sup>1)</sup>             | dBA                        | 55   | 67,6   |   |                  |
| <b>II. KIMIA 1</b>  |                                      |                            |  |        |   |                  |
| 1                   | Hidrogen Sulfida (H <sub>2</sub> S)  | ppm                        | 0,02                                       | 0,0031 | The Analysis of Air Pollutants,<br>W Leithe 19715.5 (143) |                  |
| 2                   | Amoniak (NH <sub>3</sub> )           | ppm                        | 2,0  | -      | SNI 19 - 7119.1 - 2005                                    |                  |
| <b>III. KIMIA 2</b> |                                      |                            |  |        |   |                  |
| 1                   | Sulfur Dioksida (SO <sub>2</sub> )   | µg/Nm <sup>3</sup> /1 jam  | 900  | 104,36 | SNI 19 - 7119.7 - 2005                                    |                  |
| 2                   | Karbon Monoksida (CO)                | µg/Nm <sup>3</sup> /1 jam  | 30000                                      | -      | NDIR  |                  |
| 3                   | Nitrogen Dioksida (NO <sub>2</sub> ) | µg/Nm <sup>3</sup> /1 jam  | 400  | 52,7   | SNI 19 - 7119.2 - 2005                                    |                  |
| 4                   | TSP                                  | µg/Nm <sup>3</sup> /24 jam | 230  | -      | SNI 19 - 7119.3 - 2005                                    |                  |
| 5                   | Timbal (Pb)                          | µg/Nm <sup>3</sup> /24 jam | 2  | -      | SNI 19 - 7119.4 - 2005                                    |                  |
| 6                   | Hidrokarbon (HC)                     | µg/Nm <sup>3</sup> /24 jam | 160  | -      | Flame Ionization Detector (FID)                           |                  |
| 7                   | PM <sub>10</sub>                     | µg/Nm <sup>3</sup> /24 jam | 150  | -      |   |                  |
| 8                   | PM <sub>2,5</sub>                    | µg/Nm <sup>3</sup> /24 jam | 65   | -      |   |                  |
| 9                   | Oksidan (O <sub>3</sub> )            | µg/Nm <sup>3</sup> /1 jam  | 235  | -      | SNI 19 - 7119.8 - 2005                                    |                  |

**Keterangan:**

- \*\*) Tidak dipersyaratkan
- #) Tidak ada satuan
- ) Tidak diperiksa (tidak diminta)

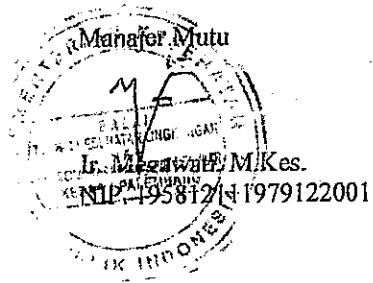
<sup>1)</sup> Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005 tentang Nilai Ambang  
 Batas Kebisingan Untuk Perumahan & Pemukiman 55 dBA  
 (Batas Toleransi + 3 dBA)  
 KIMIA 1 : Berdasar Kep.Men. KLH No. 50 Th. 1996  
 KIMIA 2 : Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005

S 03°48'07,4"  
 E 104°55'34,4"

Palembang, 31 Mei 2011

Manajer Teknis Kimia Udara

Siti Fatimah ST, MKM  
 NIP. 197509121998032003





**KEMENTERIAN KESEHATAN**  
**DIREKTORAT JENDERAL PENGENDALIAN PENYAKIT**  
**DAN PENYEHATAN LINGKUNGAN**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN**  
**DAN PEMBERANTASAN PENYAKIT MENULAR KELAS I**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

Telp./Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**

IR.02.02/IX.8/244 /11

**UMUM**

|                            |   |   |
|----------------------------|---|---|
| No. Urut                   | : | 235   |
| Laboratorium               | : | Kimia Udara   |
| Jenis Sampel               | : | Udara Ambient   |
| Asal Sampel                | : | BBWSS VII   |
| Lokasi Sampel              | : | Desa Karang Melati  |
| Diambil oleh               | : | Staf BBWSS VII<br>(Pengambilan Sampel Tanggungjawab Konsumen) |
| Dambil/Diterima tanggal    | : | 13 Mei 2011 / 18 Mei 2011                                     |
| Jam Pengukuran/Pengambilan | : | 13.46 WIB   |
| Tanggal Pengujian di Lab.  | : | 18 Mei 2011   |
| No. Lab                    | : | 1776/S-U/V/2011   |

**HASIL UJI**

| No.                 | Parameter                            | Satuan                      | Batas Maksimum yang Diperbolehkan | Hasil  | Metode Pemeriksaan                                     | Titik Ordinat |
|---------------------|--------------------------------------|-----------------------------|-----------------------------------|--------|--|---------------|
| <b>I. FISIKA</b>    |                                      |                             |                                   |        |  |               |
| 1                   | Subu                                 | °C                          | **                                | 23,9   | ASTM Standards 1977 (E337)                             |               |
| 2                   | Kelembaban                           | %RH                         | **                                | 57,3   | ASTM Standards 1977 (E337)                             |               |
| 3                   | Arah angin                           | #                           | **                                | -      |  |               |
| 4                   | Kec. Angin                           | Fit/mnt                     | **                                | -      |  |               |
| 5                   | Kebisingan <sup>1)</sup>             | dBA                         | 55                                | 49,3   |  |               |
| <b>II. KIMIA 1</b>  |                                      |                             |                                   |        |  |               |
| 1                   | Hidrogen Sulfida (H <sub>2</sub> S)  | ppm                         | 0,02                              | 0,0025 | The Analysis of Air Pollutants, W Leithe 19715.5 (143) |               |
| 2                   | Amoniak (NH <sub>3</sub> )           | ppm                         | 2,0                               | -      | SNI 19 - 7119.1 - 2005                                 |               |
| <b>III. KIMIA 2</b> |                                      |                             |                                   |        |  |               |
| 1                   | Sulfur Dioksida (SO <sub>2</sub> )   | µg/Nm <sup>3</sup> /1jam    | 900                               | 98,18  | SNI 19 - 7119.7 - 2005                                 |               |
| 2                   | Karbon Monoksida (CO)                | µg/Nm <sup>3</sup> /1 jam   | 30000                             | -      | NDIR   |               |
| 3                   | Nitrogen Dioksida (NO <sub>2</sub> ) | µg/Nm <sup>3</sup> /1 jam   | 400                               | 48,35  | SNI 19 - 7119.2 - 2005                                 |               |
| 4                   | TSP                                  | µg /Nm <sup>3</sup> /24 jam | 230                               | -      | SNI 19 - 7119.3 - 2005                                 |               |
| 5                   | Timbal (Pb)                          | µg /Nm <sup>3</sup> /24 jam | 2                                 | -      | SNI 19 - 7119.4 - 2005                                 |               |
| 6                   | Hidrokarbon (HC)                     | µg /Nm <sup>3</sup> /24 jam | 160                               | -      | Flame Ionization Detector (FID)                        |               |
| 7                   | PM <sub>10</sub>                     | µg /Nm <sup>3</sup> /24 jam | 150                               | -      |  |               |
| 8                   | PM <sub>2,5</sub>                    | µg /Nm <sup>3</sup> /24 jam | 65                                | -      |  |               |
| 9                   | Oksidan (O <sub>3</sub> )            | µg/Nm <sup>3</sup> /1 jam   | 235                               | -      | SNI 19 - 7119.8 - 2005                                 |               |

**Keterangan:**

\*\*) Tidak dipersyaratkan

#) Tidak ada satuan

-) Tidak diperiksa (tidak diminta)

<sup>1)</sup> Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005 tentang Nilai Ambang

Batas Kebisingan Untuk Perumahan & Penikiman 55 dBA

(Batas Toleransi + 3 dBA)

KIMIA 1 : Berdasar Kep.Men. KLH No. 50 Th. 1996

KIMIA 2 : Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005

S 03°56'03,2"  
E 104°49'45,3"

Palembang, 31 Mei 2011

Manajer Teknis Kimia Udara

Siti Fatimah ST, MKM  
NIP. 197507121998032003

Manajer Muks

JL. MEGAHAN, M.Kes.  
NIP. 195812111979122001

REPUBLIK INDONESIA



**KEMENTERIAN KESEHATAN**  
**DIREKTORAT JENDERAL PENGENDALIAN PENYAKIT**  
**DAN PENYEHATAN LINGKUNGAN**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN**  
**DAN PEMBERANTASAN PENYAKIT MENULAR KELAS I**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

Telp./Fax. 0711 - 351278

**SERTIFIKAT HASIL PENGUJIAN**

IR.02.02/IX.8/244/11

**UMUM**

|                            |   |   |
|----------------------------|---|---|
| No. Urut                   | : | 235   |
| Laboratorium               | : | Kimia Udara   |
| Jenis Sampel               | : | Udara Ambient   |
| Asal Sampel                | : | BBWSS VII   |
| Lokasi Sampel              | : | Desa Karang Anyar   |
| Diambil oleh               | : | Staf BBWSS VII<br>(Pengambilan Sampel Tanggungjawab Konsumen) |
| Diambil/Diterima tanggal   | : | 13 Mei 2011 / 18 Mei 2011                                     |
| Jam Pengukuran/Pengambilan | : | 15.30 WIB   |
| Tanggal Pengujian di Lab.  | : | 18 Mei 2011   |
| No. Lab                    | : | 1777/S-U/V/2011   |

**HASIL UJI**

| No.                 | Parameter                            | Satuan                     | Batas Maksimum yang Diperbolehkan | Hasil  | Metode Pemeriksaan                                     | Titik Ordinat |
|---------------------|--------------------------------------|----------------------------|-----------------------------------|--------|--|---------------|
| <b>I. FISIKA</b>    |                                      |                            |                                   |        |  |               |
| 1                   | Suhu                                 | °C                         | **                                | 30     | ASTM Standards 1977 (E337)                             |               |
| 2                   | Kelembaban                           | %RH                        | **                                | 37,2   | ASTM Standards 1977 (E337)                             |               |
| 3                   | Arah angin                           | #                          | **                                | -      |  |               |
| 4                   | Kec. Angin                           | Fit/mnt                    | **                                | -      |  |               |
| 5                   | Kebisingan <sup>1)</sup>             | dBA                        | 55                                | 49,4   |  |               |
| <b>II. KIMIA 1</b>  |                                      |                            |                                   |        |  |               |
| 1                   | Hidrogen Sulfida (H <sub>2</sub> S)  | ppm                        | 0,02                              | 0,0028 | The Analysis of Air Pollutants, W Leithe 19715.5 (143) |               |
| 2                   | Amoniak (NH <sub>3</sub> )           | ppm                        | 2,0                               | -      | SNI 19 - 7119.1 - 2005                                 |               |
| <b>III. KIMIA 2</b> |                                      |                            |                                   |        |  |               |
| 1                   | Sulfur Dioksida (SO <sub>2</sub> )   | µg/Nm <sup>3</sup> /1 jam  | 900                               | 99,90  | SNI 19 - 7119.7 - 2005                                 |               |
| 2                   | Karbon Monoksida (CO)                | µg/Nm <sup>3</sup> /1 jam  | 30000                             | -      | NDIR   |               |
| 3                   | Nitrogen Dioksida (NO <sub>2</sub> ) | µg/Nm <sup>3</sup> /1 jam  | 400                               | 49,42  | SNI 19 - 7119.2 - 2005                                 |               |
| 4                   | TSP                                  | µg/Nm <sup>3</sup> /24 jam | 230                               | -      | SNI 19 - 7119.3 - 2005                                 |               |
| 5                   | Timbal (Pb)                          | µg/Nm <sup>3</sup> /24 jam | 2                                 | -      | SNI 19 - 7119.4 - 2005                                 |               |
| 6                   | Hidrokarbon (HC)                     | µg/Nm <sup>3</sup> /24 jam | 160                               | -      | Flame Ionization Detector (PID)                        |               |
| 7                   | PM <sub>10</sub>                     | µg/Nm <sup>3</sup> /24 jam | 150                               | -      |  |               |
| 8                   | PM <sub>2,5</sub>                    | µg/Nm <sup>3</sup> /24 jam | 65                                | -      |  |               |
| 9                   | Oksidan (O <sub>3</sub> )            | µg/Nm <sup>3</sup> /1 jam  | 235                               | -      | SNI 19 - 7119.8 - 2005                                 |               |

**Keterangan:**

- \*\*) Tidak diperlukan persyaratan
- #) Tidak ada satuan
- ) Tidak diperiksa (tidak diminta)

<sup>1)</sup> Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005 tentang Nilai Ambang Batas Kebisingan Untuk Perumahan & Pemukiman 55 dBA (Batas Toleransi + 3 dBA)  
 KIMIA 1 : Berdasar Kep.Men. KLH No. 50 Th. 1996  
 KIMIA 2 : Berdasar Per.Gub. Sum.Sel No. 17 Th. 2005

Palembang, 31 Mei 2011

Manajer Teknis Kimia Udara

Siti Fatimah, ST, MM  
 NIP. 197507211998032003

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 NIP. 195812111979122001



**KEMENTERIAN KESEHATAN RI**  
**DIREKTORAT JENDERAL PP & PL**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN &**  
**PEMBERANTASAN PENYAKIT MENULAR**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

Telp. 0711 - 351278 Fax. 0711-351278

**KAN**  
 Komite Akreditasi Nasional  
 Laboratorium Pengujian  
 LP - 449 - IDN

**SERTIFIKAT HASIL PENGUJIAN**  
**IR.02.02/IX.8/244 /11**

**UMUM**

|                             |  |
|-----------------------------|--|
| Laboratorium                | : Kimia Air  |
| Jenis Sampel                | : Air Bersih   |
| Kondisi Sampel/Abnormalitas | : Normal   |
| No. Urut Sampel             | : 235  |
| Kode Sampel                 | : A <sub>1</sub> : Sumur Tugu Mulyo                              |
| Berasal dari                | : BBWSS VII  |
| Diambil oleh                | : Staf BBWSS VII<br>(Pengambilan Sampel Tanggung jawab Konsumen) |
| Diambil/Diterima tanggal    | : 14 Mei 2011/18 Mei 2011  |
| Tgl. Pengujian di Lab       | : 18 Mei 2011  |
| No. Lab                     | : 1768/S-A/V/2011  |

**HASIL UJI**

| No               | Parameter                                | Satuan    | Batas maksimum yang diperbolehkan | Hasil      | Metode Pemeriksaan  |
|------------------|--|-----------|-----------------------------------|------------|---------------------|
| <b>A. FISIKA</b> |  |           |                                   |            |                     |
| 1                | Bau                                      | #         | -                                 | Tdk Berbau | Organoleptik        |
| 2                | Rasa                                     | #         | -                                 | Tdk Berasa | Organoleptik        |
| 3                | Total zat padat terlarut (TDS)           | mg/liter  | 1500                              | 326        | SNI 06-6989.27-2004 |
| 4                | Kekeruhan*                               | Skala NTU | 25                                | 10,53      | SNI 06-6989.25-2004 |
| 5                | Suhu *(diLaboratorium)                   | °C        | Suhu udara + 3°C                  | 22,0       | SNI 06-6989.23-2004 |
| 6                | Warna                                    | Skala TCU | 50                                | 17         | Spektrofotometri    |
| <b>B. KIMIA</b>  |  |           |                                   |            |                     |
| 1                | Besi (Fe) *                              | mg/L      | 1,0                               | 0,1084     | SNI 6989.4-2009     |
| 2                | Fluorida (F) *                           | mg/L      | 1,5                               | 0,0013     | SNI 06-6989.29-2004 |
| 3                | Kecadasan (CaCO <sub>3</sub> ) *         | mg/L      | 500                               | 176,4      | SNI 6989.19-2009    |
| 4                | Klorida (Cl) *                           | mg/L      | 600                               | 7,6        | SNI 6989.19-2009    |
| 5                | Mangan (Mn) *                            | mg/L      | 0,5                               | 0,0098     | SNI 6989.5-2009     |
| 6                | Nitrat, sebagai N (NO <sub>3</sub> -N)   | mg/L      | 10                                | 0,09       | SNI 06-2480.1991    |
| 7                | Nitrit, sebagai N (NO <sub>2</sub> -N) * | mg/L      | 1,0                               | 0,0110     | SNI 06-6989.9-2004  |
| 8                | pH *(diLaboratorium)                     | #         | 6,5 – 9,0                         | 7,39       | SNI 06-6989.11-2004 |
| 9                | Sulfat (SO <sub>4</sub> ) *              | mg/L      | 400                               | 18,914     | SNI 6989.20-2009    |
| 10               | Zat Organik (KMnO <sub>4</sub> )         | mg/L      | 10                                | 0,474      | SNI 06-6989.22-2004 |
| 11               | Air Raksasa (Hg)                         | mg/L      | 0,001                             | tt         | AAS-MVU             |
| 12               | Arsen (As)                               | mg/L      | 0,05                              | tt         | AAS-HVG             |
| 13               | Kadmium (Cd) *                           | mg/L      | 0,005                             | tt<0,0032  | SNI 6989.16-2009    |
| 14               | Selenium (Se)                            | mg/L      | 0,01                              | tt         | AAS-HVG             |
| 15               | Seng (Zn) *                              | mg/L      | 15                                | 0,8124     | SNI 6989.7-2009     |
| 16               | Sianida (CN)                             | mg/L      | 0,1                               | 0,009      | Spektrofotometri    |
| 17               | Timbal (Pb) *                            | mg/L      | 0,05                              | tt<0,0022  | SNI 6989.8-2009     |

#) : Tidak ada satuan      -) : Tidak dipersyaratkan      \*): Terakreditasi      tt) : Tidak terdeteksi

Catatan : Memiliki persyaratan yang telah ditetapkan berdasar PER.MEN.KES RI NO. 416/PER/X/1990



Palembang, 06 Juni 2011  
 Manager Teknis Kimia Air

Nurul Padillah, S.Si  
 NIP. 19800908 200312 2003



**KEMENTERIAN KESEHATAN RI  
DIREKTORAT JENDERAL PP & PL  
BALAI TEKNIK KESEHATAN LINGKUNGAN &  
PEMBERANTASAN PENYAKIT MENULAR  
PALEMBANG**

Jln. Jend. Sudirman Km. 2,5 No. 7490

**KAN**

Komite Akreditasi Nasional

Laboratorium Penguj

LP - 449 - IDN

Telp. 0711 - 351278 Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN  
IR.02.02/IX.8/244/11**

**UMUM**

Laboratorium : Kimia Air  
 Jenis Sampel : Air Bersih  
 Kondisi Sampel/Abnormalitas : Normal  
 No. Urut Sampel : 235  
 Kode Sampel : A<sub>2</sub> : Sumur Karang Anyar  
 Berasal dari : BBWSS VII  
 Diambil oleh : Staf BBWSS VII  
 (Pengambilan Sampel Tanggung jawab Konsumen)  
 Diambil/Diterima tanggal : 14 Mei 2011/18 Mei 2011  
 Tgl. Pengujian di Lab : 18 Mei 2011  
 No. Lab : 1769/S-A/V/2011

**HASIL UJI**

| No               | Parameter                                    | Satuan    | Batas maksimum yang diperbolehkan | Hasil      | Metode Pemeriksaan  |
|------------------|--|-----------|-----------------------------------|------------|---------------------|
| <b>A. FISIKA</b> |  |           |                                   |            |                     |
| 1                | Bau  | #         | -                                 | Tdk Berbau | Organoleptik        |
| 2                | Rasa   | #         | -                                 | Tdk Berasa | Organoleptik        |
| 3                | Total zat padat terlarut (TDS)               | mg/liter  | 1500                              | 57         | SNI 06-6989.27-2004 |
| 4                | Kekeruhan*                                   | Skala NTU | 25                                | 0,12       | SNI 06-6989.25-2004 |
| 5                | Suhu *(diLaboratorium)                       | °C        | Suhu udara ± 3°C                  | 22,1       | SNI 06-6989.23-2004 |
| 6                | Warna  | Skala TCU | 50                                | 7          | Spektrofotometri    |
| <b>B. KIMIA</b>  |  |           |                                   |            |                     |
| 1                | Besi (Fe) *                                  | mg/L      | 1,0                               | 0,0781     | SNI 6989.4-2009     |
| 2                | Fluorida (F)                                 | mg/L      | 1,5                               | 0,003      | SNI 06-6989.29-2004 |
| 3                | Kecerdahan (CaCO <sub>3</sub> ) *            | mg/L      | 500                               | 161,7      | SNI 06-6989.12-2004 |
| 4                | Klorida (Cl) *                               | mg/L      | 600                               | 2,0        | SNI 6989.19-2009    |
| 5                | Mangan (Mn) *                                | mg/L      | 0,5                               | 0,0108     | SNI 6989.5-2009     |
| 6                | Nitrat, sebagaimana N (NO <sub>3</sub> -N)   | mg/L      | 10                                | 0,08       | SNI 06-2480.1991    |
| 7                | Nitrit, sebagaimana N (NO <sub>2</sub> -N) * | mg/L      | 1,0                               | 0,0124     | SNI 06-6989.9-2004  |
| 8                | pH *(diLaboratorium)                         | #         | 6,5 - 9,0                         | 5,93       | SNI 06-6989.11-2004 |
| 9                | Sulfat (SO <sub>4</sub> ) *                  | mg/L      | 400                               | 21,103     | SNI 6989.20-2009    |
| 10               | Zat Organik (KMnO <sub>4</sub> )             | mg/L      | 10                                | 0,537      | SNI 06-6989.22-2004 |
| 11               | Air Raksasa (H <sub>2</sub> )                | mg/L      | 0,001                             | tt         | AAS-MVU             |
| 12               | Arsen (As)                                   | mg/L      | 0,05                              | tt         | AAS-HVG             |
| 13               | Kadmium (Cd) *                               | mg/L      | 0,005                             | tt<0,0032  | SNI 6989.16-2009    |
| 14               | Selenium (Se)                                | mg/L      | 0,01                              | tt         | AAS-HVG             |
| 15               | Seng (Zn) *                                  | mg/L      | 15                                | 0,2481     | SNI 6989.7-2009     |
| 16               | Sianida (CN)                                 | mg/L      | 0,1                               | 0,005      | Spektrofotometri    |
| 17               | Timbal (Pb) *                                | mg/L      | 0,05                              | tt<0,0022  | SNI 6989.8-2009     |

#) : Tidak ada satuan

-) : Tidak dipersyaratkan

\*): Terakreditasi

tt) : Tidak terdeteksi

Catatan : pH Asam berdasarkan PER.MEN.KES RI NO. 416/PER/X/1990



Ir. Megawati, M.Kes  
NIP. 19591211 97912 2001

Palembang, 06 Juni 2011  
Manajer Teknis Kimia Air

*E. Smulif*

Nurul Fadillah, S.Si  
NIP. 19860908 200312 2003



**KEMENTERIAN KESEHATAN RI**  
**DIREKTORAT JENDERAL PP & PL**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN &**  
**PEMBERANTASAN PENYAKIT MENULAR**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

**KAN**

Komite Akreditasi Nasional

Laboratorium Pengujian

LP - 449 - IDN

Telp. 0711-351278 Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**

IR.02.02/IX.8/244/11

**UMUM**

Laboratorium : Kimia Air  
 Jenis Sampel : Air Permukaan  
 Kondisi Sampel/Abnormalitas : Normal  
 No. Urut Sampel : 235  
 Kode Sampel : Sungai Macak Hilir  
 Berasal dari : BBWSS II  
 Diambil oleh : Staf BBWSS VII  
 (Pengambilan Sampel Tanggung jawab Konsumen)  
 Diambil/Diterima tanggal : 14 Mei 2011/18 Mei 2011  
 Tgl. Pengujian di Lab. : 18 Mei 2011  
 No. Lab : 1772/S-A/V/2011

**HASIL UJI**

| No                     | Parameter  | Satuan | Kadar maksimum<br>Air Sungai<br>Kelas I | Hasil     | Metode Pemeriksaan  |
|------------------------|--|--------|---|-----------|---------------------|
| <b>FISIKA</b>          |  |        |   |           |                     |
| 1                      | Temperatur*<br><i>(diLaboratorium)</i>                 | °C     | Deviasi ±5 °C                           | 21,9      | SNI 06-6989.23-2004 |
| 2                      | Zat padat terlarut                                     | mg/L   | 1500                                    | 30        | SNI 06-6989.27-2004 |
| 3                      | Zat padat tersuspensi                                  | mg/L   | 50                                      | 12,6      | SNI 06-6989.3-2004  |
| <b>Kimia Anorganik</b> |  |        |   |           |                     |
| 1                      | pH *<br><i>(diLaboratorium)</i>                        | #      | 6 - 9                                   | 7,18      | SNI 06-6989.11-2004 |
| 2                      | Besi terlarut<br><i>(Fe) *</i>                         | mg/L   | 0,3                                     | 0,2046    | SNI 6989.4-2009     |
| 3                      | Mangan terlarut<br><i>(Mn) *</i>                       | mg/L   | 0,1                                     | 0,0193    | SNI 6989.5-2009     |
| 4                      | Seng<br><i>(Zn) *</i>                                  | mg/L   | 0,5                                     | 0,4081    | SNI 6989.7-2009     |
| 5                      | Cadmium<br><i>(Cd) *</i>                               | mg/L   | 0,1                                     | tt<0,0032 | SNI 6989.16-2009    |
| 6                      | Raksa<br><i>(Hg)</i>                                   | mg/L   | 0,001                                   | tt        | AAS-MVU             |
| 7                      | Timbal<br><i>(Pb) *</i>                                | mg/L   | 0,03                                    | tt<0,0022 | SNI 6989.8-2009     |
| 8                      | Sulfat<br><i>(SO<sub>4</sub>) *</i>                    | mg/L   | 400                                     | 25,117    | SNI 6989.20-2009    |
| 9                      | Arsen<br><i>(As)</i>                                   | mg/L   | 0,05                                    | tt        | AAS-HVG             |
| 10                     | Selenium<br><i>(Se)</i>                                | mg/L   | 0,01                                    | tt        | AAS-HVG             |
| 11                     | Sianida<br><i>(CN)</i>                                 | mg/L   | 0,02                                    | 0,002     | Spektrofotometri    |
| 12                     | Fluorida<br><i>(F)</i>                                 | mg/L   | 0,5                                     | 0,0012    | SNI 06-6989.29-2004 |
| 13                     | Klorida<br><i>(Cl) *</i>                               | mg/L   | 600                                     | 4,0       | SNI 6989.19-2009    |
| 14                     | Amonia Bebas<br><i>(NH<sub>3</sub>)</i>                | mg/L   | 0,5                                     | 0,12      | SNI 06-6989.30-2004 |
| 15                     | Nitrat<br><i>(NO<sub>3</sub>)</i>                      | mg/L   | 10                                      | 0,16      | SNI 06-2480.1991    |
| 16                     | Nitrit<br><i>(NO<sub>2</sub>) *</i>                    | mg/L   | 0,06                                    | 0,0257    | SNI 06-6989.9-2004  |
| 17                     | Kebutuhan Oksigen Biokimia<br><i>(BOD<sub>5</sub>)</i> | mg/L   | 2                                       | 1,85      | SNI 6989.72-2009    |
| 18                     | Kebutuhan Oksigen Kimia<br><i>(COD)</i>                | mg/L   | 10                                      | 2         | SNI 6989.2-2009     |
| 19                     | Dissolved Oxygen<br><i>(DO)</i>                        | mg/L   | 6                                       | 4,87      | SNI 06-6989.14-2004 |
| 20                     | Tembaga<br><i>(Cu) *</i>                               | mg/L   | 2                                       | tt<0,0030 | SNI 6989.6-2009     |
| 21                     | Cobalt<br><i>(Co)</i>                                  | mg/L   | 0,2                                     | tt        | SNI 6989.68-2009    |
| 22                     | Sulfida<br><i>(HS)</i>                                 | mg/L   | 0,002                                   | 0,0002    | SNI 6989.70-2009    |
| 23                     | Feosfat<br><i>(PO<sub>4</sub>)</i>                     | mg/L   | 0,2                                     | 0,003     | SNI 06-6989.31-2004 |
| <b>Kimia Organik</b>   |  |        |   |           |                     |
| 1                      | Minyak & Lemak   | µg/L   | 1000                                    | 79        | SNI 06-6989.10-2004 |
| 2                      | Detergen   | µg/L   | 200                                     | 0,06      | SNI 06-6989.10-2004 |
| 3                      | Perok  | mg/L   | 1                                       | 0,2       | SNI 06-6989.21-2004 |

\* : Terakreditasi      tt : Tidak terdeteksi      # : Tidak ada satuan

Catatan : Memenuhi persyaratan yang telah ditetapkan berdasar Peraturan Gubernur Sumsel No. 16 Th 2005.

*Manajer Mutu*

*Manajer Teknis Kimia Air*

Palangka Raya, 26 Juni 2011  
*Manajer Teknis Kimia Air*

*Sumit*

Nurul Fadillah, S.Si

NIP. 19800908 200312 2003

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NIP. 19581211 197912 2001



**KEMENTERIAN KESEHATAN RI**  
**DIREKTORAT JENDERAL PP & PL**  
**RALAI TEKNIK KESEHATAN LINGKUNGAN &**  
**PEMBERANTASAN PENYAKIT MENULAR**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490

**KAN**

Komite Akreditasi Nasional

Laboratorium Pengujian

LP - 449 - IDN

Telp. 0711 - 351278 Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**

**IR.02.02/EK.3/24/11**

**UMUM**

|                             |  |
|-----------------------------|--|
| Laboratorium                | : Kimia Air  |
| Jenis Sampel                | : Air Permukaan  |
| Kondisi Sampel/Abnormalitas | : Normal   |
| No. Urut Sampel             | : 235  |
| Kode Sampel                 | : Sungai Macak Hulu  |
| Berasal dari                | : BBWSS II   |
| Diambil oleh                | : Staf BBWSS VII<br>(Pengambilan Sampel Tenggung jawab Konsumen) |
| Diambil/Diterima tanggal    | : 14 Mei 2011/18 Mei 2011  |
| Tgl. Pengujian di Lab       | : 18 Mei 2011  |
| No. Lab                     | : 1771/S-A/V/2011  |

**HASIL UJI**

| No.                    | Parameter  | Satuan | Kadar maksimum<br>Air Sungai<br>Kelas I | Hasil     | Metode Pemeriksaan  |
|------------------------|--|--------|---|-----------|---------------------|
| <b>FISIKA</b>          |  |        |   |           |                     |
| 1                      | Temperatur *<br><i>(diLaboratorium)</i>                | °C     | Deviasi ± 3 °C                          | 21,8      | SNI 06-6989.23-2004 |
| 2                      | Zat padat terlarut                                     | mg/L   | 1500                                    | 33        | SNI 06-6989.27-2004 |
| 3                      | Zat padat tersuspensi                                  | mg/L   | 50                                      | 10,8      | SNI 06-6989.3-2004  |
| <b>Kimia Anorganik</b> |  |        |   |           |                     |
| 1                      | pH *<br><i>(diLaboratorium)</i>                        | #      | 6 - 9                                   | 6,78      | SNI 06-6989.11-2004 |
| 2                      | Besi terlarut<br><i>(Fe) *</i>                         | mg/L   | 0,3                                     | 0,1044    | SNI 6989.4-2009     |
| 3                      | Mangan terlarut<br><i>(Mn) *</i>                       | mg/L   | 0,1                                     | 0,0186    | SNI 6989.5-2009     |
| 4                      | Seng<br><i>(Zn) *</i>                                  | mg/L   | 0,5                                     | 0,4071    | SNI 6989.7-2009     |
| 5                      | Cadmium<br><i>(Cd) *</i>                               | mg/L   | 0,1                                     | tt<0,0032 | SNI 6989.16-2009    |
| 6                      | Raksa<br><i>(Hg)</i>                                   | mg/L   | 0,001                                   | tt        | AAS-MVU             |
| 7                      | Timbal<br><i>(Pb) *</i>                                | mg/L   | 0,03                                    | tt<0,0022 | SNI 6989.8-2009     |
| 8                      | Sulfat<br><i>(SO<sub>4</sub>) *</i>                    | mg/L   | 400                                     | 23,052    | SNI 6989.20-2009    |
| 9                      | Arsen<br><i>(As)</i>                                   | mg/L   | 0,05                                    | tt        | AAS-HVG             |
| 10                     | Selenium<br><i>(Se)</i>                                | mg/L   | 0,01                                    | tt        | AAS-HVG             |
| 11                     | Sianida<br><i>(CN)</i>                                 | mg/L   | 0,02                                    | 0,004     | Spektrofotometri    |
| 12                     | Fluorida<br><i>(F)</i>                                 | mg/L   | 0,5                                     | 0,002     | SNI 06-6989.29-2004 |
| 13                     | Klorida<br><i>(Cl) *</i>                               | mg/L   | 600                                     | 3,0       | SNI 6989.19-2009    |
| 14                     | Amonia Bebas<br><i>(NH<sub>3</sub>)</i>                | mg/L   | 0,5                                     | 0,11      | SNI 06-6989.30-2004 |
| 15                     | Nitrat<br><i>(NO<sub>3</sub>)</i>                      | mg/L   | 10                                      | 0,13      | SNI 06-2480.1991    |
| 16                     | Nitrit<br><i>(NO<sub>2</sub>) *</i>                    | mg/L   | 0,06                                    | 0,0110    | SNI 06-6989.9-2004  |
| 17                     | Kebutuhan Oksigen Biokimia<br><i>(BOD<sub>5</sub>)</i> | mg/L   | 2                                       | 1,80      | SNI 6989.72.2009    |
| 18                     | Kebutuhan Oksigen Kimia<br><i>(COD)</i>                | mg/L   | 10                                      | 2         | SNI 6989.2-2009     |
| 19                     | Dissolved Oxygen<br><i>(DO)</i>                        | mg/L   | 6                                       | 2,93      | SNI 06-6989.14-2004 |
| 20                     | Tembaga<br><i>(Cu) *</i>                               | mg/L   | 2                                       | tt<0,0030 | SNI 6989.6-2009     |
| 21                     | Cobalt<br><i>(Co)</i>                                  | mg/L   | 0,2                                     | tt        | SNI 6989.68.2009    |
| 22                     | Sulfida<br><i>(H<sub>2</sub>S)</i>                     | mg/L   | 0,002                                   | 0,0001    | SNI 6989.70.2009    |
| 23                     | Fosfat<br><i>(PO<sub>4</sub>)</i>                      | mg/L   | 0,2                                     | 0,008     | SNI 06-6989.31-2004 |
| <b>Kimia Organik</b>   |  |        |   |           |                     |
| 1                      | Minyak & Lemak   | µg/L   | 1000                                    | 83        | SNI 06-6989.10-2004 |
| 2                      | Detergen   | µg/L   | 200                                     | 0,03      | SNI 06-6989.10-2004 |
| 3                      | Phenol   | mg/L   | 1                                       | 0,96      | SNI 06-6989.21-2004 |

\* : Terakreditasi      tt : Tidak terdeteksi

#: Tidak ada satuan

Catatan : Memenuhi persyaratan yang telah ditetapkan berdasar Peraturan Gubernur Sumsel No. 16 Th 2005

Manajer Mutu

Ir. Megawati, M.Kes  
NIP. 19581211 97912 2001

Palembang, 06 Juni 2011:  
Manajer Teknis Kimia Air

*Nurul Fadillah*

Nurul Fadillah, S.Si  
NIP. 19800908 200312 2003



**KEMENTERIAN KESEHATAN RI**  
**DIREKTORAT JENDERAL PP & PL**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN &**  
**PEMBERANTASAN PENYAKIT MENULAR**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490



Komite Akreditasi Nasional

Laboratorium Pengujian

LP - 449 - IDN

Telp. 0711 - 351278 Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**

**IR.02.02/IX.8/244/11**

**UMUM**

Laboratorium : Kimia Air  
 Jenis Sampel : Air Permukaan  
 Kondisi Sampel/Abnormalitas : Normal  
 No. Urut Sampel : 235  
 Kode Sampel : Lempuing Hilir  
 Berasal dari : BBWSS II  
 Diambil oleh : Staf BBWSS VII  
 (Pengambilan Sampel Tanggung jawab Konsumen)  
 Dambil/Diterima tanggal : 14 Mei 2011/18 Mei 2011  
 Tgl. Pengujian di Lab : 18 Mei 2011  
 No. Lab : 1774/S-A/V/2011

**HASIL UJI**

| No                     | Parameter   | Satuan | Kadar maksimum<br>Air Sungai<br>Kelas I | Hasil   | Metode Pemeriksaan  |
|------------------------|---|--------|---|---------|---------------------|
| <b>FISIKA</b>          |   |        |   |         |                     |
| 1                      | Temperatur*<br>(di laboratorium)                  | °C     | Deviasi ±3 °C                           | 22,0    | SNI 06-6989.23-2004 |
| 2                      | Zat padat terlarut<br>(Fe) *                      | mg/L   | 1500                                    | 16      | SNI 06-6989.27-2004 |
| 3                      | Zat padat tersuspensi                             | mg/L   | 50                                      | 11,2    | SNI 06-6989.3-2004  |
| <b>Kimia Anorganik</b> |   |        |   |         |                     |
| 1                      | pH *<br>(di laboratorium)                         | #      | 6 - 9                                   | 6,49    | SNI 06-6989.11-2004 |
| 2                      | Besi terlarut<br>(Fe) *                           | mg/L   | 0,3                                     | 0,2471  | SNI 6989.4-2009     |
| 3                      | Mangan terlarut<br>(Mn) *                         | mg/L   | 0,1                                     | 0,0204  | SNI 6989.5-2009     |
| 4                      | Senyawa<br>(Zn) *                                 | mg/L   | 0,5                                     | 0,0903  | SNI 6989.7-2009     |
| 5                      | Cadmium<br>(Cd) *                                 | mg/L   | 0,1                                     | <0,0032 | SNI 6989.16-2009    |
| 6                      | Raksa<br>(Hg)                                     | mg/L   | 0,001                                   | tt      | AAS-MVU             |
| 7                      | Timbal<br>(Pb) *                                  | mg/L   | 0,03                                    | <0,0022 | SNI 6989.8-2009     |
| 8                      | Sulfat<br>(SO <sub>4</sub> ) *                    | mg/L   | 400                                     | 19,170  | SNI 6989.20-2009    |
| 9                      | Arsen<br>(As)                                     | mg/L   | 0,05                                    | tt      | AAS-HVG             |
| 10                     | Selenium<br>(Se)                                  | mg/L   | 0,01                                    | tt      | AAS-JVVG            |
| 11                     | Sianida<br>(CN)                                   | mg/L   | 0,02                                    | 0,0015  | Spektrofotometri    |
| 12                     | Fluorida<br>(F)                                   | mg/L   | 0,5                                     | 0,003   | SNI 06-6989.29-2004 |
| 13                     | Klorida<br>(Cl) *                                 | mg/L   | 600                                     | 6,0     | SNI 6989.19-2009    |
| 14                     | Amonia Bebas<br>(NH <sub>3</sub> )                | mg/L   | 0,5                                     | 0,10    | SNI 06-6989.30-2004 |
| 15                     | Nitrat<br>(NO <sub>3</sub> )                      | mg/L   | 10                                      | 0,18    | SNI 06-2480, 1991   |
| 16                     | Nitrit<br>(NO <sub>2</sub> ) *                    | mg/L   | 0,06                                    | 0,0157  | SNI 06-6989.9-2004  |
| 17                     | Kebutuhan Oksigen Biokimia<br>(BOD <sub>5</sub> ) | mg/L   | 2                                       | 1,80    | SNI 6989.72-2009    |
| 18                     | Kebutuhan Oksigen Kimia<br>(COD)                  | mg/L   | 10                                      | 2       | SNI 6989.2-2009     |
| 19                     | Dissolved Oxygen<br>(DO)                          | mg/L   | 6                                       | 4,32    | SNI 06-6989.14-2004 |
| 20                     | Tembaga<br>(Cu) *                                 | mg/L   | 2                                       | <0,0030 | SNI 6989.6-2009     |
| 21                     | Cobalt<br>(Co)                                    | mg/L   | 0,2                                     | tt      | SNI 6989.68-2009    |
| 22                     | Sulfida<br>(HS)                                   | mg/L   | 0,002                                   | 0,0001  | SNI 6989.70-2009    |
| 23                     | Fosfat<br>(PO <sub>4</sub> )                      | mg/L   | 0,2                                     | 0,007   | SNI 06-6989.31-2004 |
| <b>Kimia Organik</b>   |   |        |   |         |                     |
| 1                      | Minyak & Lemak                                    | µg/L   | 1000                                    | 82      | SNI 06-6989.10-2004 |
| 2                      | Detergen  | µg/L   | 200                                     | 0,03    | SNI 06-6989.10-2004 |
| 3                      | Fenol   | mg/L   | 1                                       | 0,2     | SNI 06-6989.21-2004 |

\* : Terakreditasi

II) : Tidak terdeteksi

#) : Tidak ada satuan

Catatan : Memenuhi persyaratan yang telah ditetapkan berdasar Peraturan Gubernur Sumsel No. 16 Th 2005.

Palembang, 16 Juni 2011

Manager Mutu

Manager Teknis Kimia Air

Nurul Fadillah, S.Si

NIP. 19800908 200312 303

Ir. Meawati, M.Kes

NIP. 19581207 197912 2001



**KEMENTERIAN KESEHATAN RI  
DIREKTORAT JENDERAL PP & PL  
BALAI TEKNIK KESEHATAN LINGKUNGAN &  
PEMBERANTASAN PENYAKIT MENULAR  
PALEMBANG**

Jln. Jend. Sudirman Km. 2,5 No. 7490

**KAN**

Komite Akreditasi Nasional

Laboratorium Penguj

LP - 449 - IDN

Telp. 0711 - 351278 Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**

IR.02.02/IX.8/24 /11

**UMUM**

Laboratorium : Kimia Air  
 Jenis Sampel : Air Permukaan  
 Kondisi Sampel/Abnormalitas : Normal  
 No. Urut Sampel : 235  
 Kode Sampel : Lempuing Hulu  
 Berasal dari : BBWSS II  
 Diambil oleh : Staf BBWSS VII  
 (Pengambilan Sampel Tanggung jawab Konsumen)  
 Diambil/Diterima tanggal : 14 Mei 2011/18 Mei 2011  
 Tgl. Pengujian di Lab : 18 Mei 2011  
 No. Lab : 1773/S-A/V/2011

**HASIL UJI**

| No                     | Parameter                                   | Satuan | Kadar maksimum<br>Air Sungai<br>Kelas I | Hasil     | Metode Pemeriksaan  |
|------------------------|---|--------|---|-----------|---------------------|
| <b>FISIKA</b>          |   |        |   |           |                     |
| 1                      | Temperatur <sup>(diLaboratorium)</sup>      | °C     | Deviasi ±3 °C                           | 21,5      | SNI 06-6989.23-2004 |
| 2                      | Zat padat terlarut                          | mg/L   | 1500                                    | 16        | SNI 06-6989.27-2004 |
| 3                      | Zat padat tersuspensi                       | mg/L   | 50                                      | 9,2       | SNI 06-6989.3-2004  |
| <b>Kimia Anorganik</b> |   |        |   |           |                     |
| 1                      | pH * <sup>(diLaboratorium)</sup>            | #      | 6 – 9                                   | 6,48      | SNI 06-6989.11-2004 |
| 2                      | Besi terlarut <sup>(Fe) *</sup>             | mg/L   | 0,3                                     | 0,0345    | SNI 6989.4-2009     |
| 3                      | Mangan terlarut <sup>(Mn) *</sup>           | mg/L   | 0,1                                     | 0,0161    | SNI 6989.5-2009     |
| 4                      | Seng <sup>(Zn) *</sup>                      | mg/L   | 0,5                                     | 0,0865    | SNI 6989.7-2009     |
| 5                      | Cadmium <sup>(Cd) *</sup>                   | mg/L   | 0,1                                     | tt<0,0032 | SNI 6989.16-2009    |
| 6                      | Raksa <sup>(Hg)</sup>                       | mg/L   | 0,001                                   | tt        | AAS-MVU             |
| 7                      | Timbal <sup>(Pb) *</sup>                    | mg/L   | 0,03                                    | tt<0,0022 | SNI 6989.8-2009     |
| 8                      | Sulfat <sup>(SO<sub>4</sub>) *</sup>        | mg/L   | 400                                     | 13,205    | SNI 6989.20-2009    |
| 9                      | Arsen <sup>(As)</sup>                       | mg/L   | 0,05                                    | tt        | AAS-HVG             |
| 10                     | Selenium <sup>(Se)</sup>                    | mg/L   | 0,01                                    | tt        | AAS-HVG             |
| 11                     | Sianida <sup>(CN)</sup>                     | mg/L   | 0,02                                    | 0,0012    | Spektrofotometri    |
| 12                     | Fluorida <sup>(F)</sup>                     | mg/L   | 0,5                                     | 0,0033    | SNI 06-6989.29-2004 |
| 13                     | Klorida <sup>(Cl) *</sup>                   | mg/L   | 600                                     | 6,0       | SNI 6989.19-2009    |
| 14                     | Amonia Bebas <sup>(NH<sub>3</sub>)</sup>    | mg/L   | 0,5                                     | 0,08      | SNI 06-6989.30-2004 |
| 15                     | Nitrat <sup>(NO<sub>3</sub>)</sup>          | mg/L   | 10                                      | 0,08      | SNI 06-2480. 1991   |
| 16                     | Nitrit <sup>(NO<sub>2</sub>) *</sup>        | mg/L   | 0,06                                    | 0,0102    | SNI 06-6989.9-2004  |
| 17                     | Kebutuhan Oksigen Biokimia <sup>(BOD)</sup> | mg/L   | 2                                       | 1,85      | SNI 6989.72.2009    |
| 18                     | Kebutuhan Oksigen Kimia <sup>(COD)</sup>    | mg/L   | 10                                      | 2         | SNI 6989.2-2009     |
| 19                     | Dissolved Oxygen <sup>(DO)</sup>            | mg/L   | 6                                       | 2,82      | SNI 06-6989.14-2004 |
| 20                     | Tembaga <sup>(Cu) *</sup>                   | mg/L   | 2                                       | tt<0,0030 | SNI 6989.6-2009     |
| 21                     | Cobalt <sup>(Co)</sup>                      | mg/L   | 0,2                                     | tt        | SNI 6989.68.2009    |
| 22                     | Sulfida <sup>(H<sub>2</sub>S)</sup>         | mg/L   | 0,002                                   | 0,00012   | SNI 6989.70.2009    |
| 23                     | Fosfat <sup>(PO<sub>4</sub>)</sup>          | mg/L   | 0,2                                     | 0,0031    | SNI 06-6989.31-2004 |
| <b>Kimia Organik</b>   |   |        |   |           |                     |
| 1                      | Minyak & Lemak                              | µg/L   | 1000                                    | 62        | SNI 06-6989.10-2004 |
| 2                      | Detergen                                    | µg/L   | 200                                     | 0,02      | SNI 06-6989.10-2004 |
| 3                      | 酚   | mg/L   | 1                                       | 0,01      | SNI 06-6989.21-2004 |

\*) : Terakredisi      tt) : Tidak terdeteksi      #) : Tidak ada satuan

Catatan : Memenuhi persyaratan yang telah ditetapkan berdasar Peraturan Gubernur Sumsel No. 16 Th 2005

Manajer Mutu

Palembang, 06 Juni 2011  
Manajer Teknis Kimia Air

N. Megawati M.Kes  
NIP. 19581211 197912 2001

Nurul Fadillah, S.Si  
NIP. 19800908 200312 2003



**KEMENTERIAN KESEHATAN RI**  
**DIREKTORAT JENDERAL PP & PL**  
**BALAI TEKNIK KESEHATAN LINGKUNGAN &**  
**PEMBERANTASAN PENYAKIT MENULAR**  
**P A L E M B A N G**

Jln. Jend. Sudirman Km. 2,5 No. 7490



Komite Akreditasi Nasional

Laboratorium Pengujian

LP - 449 - IDN

Telp. 0711 - 351278 Fax. 0711-351278

**SERTIFIKAT HASIL PENGUJIAN**  
**IR.02.02/IX.8/244/11**

**UMUM**

Laboratorium : Kimia Air  
 Jenis Sampel : Air Permukaan  
 Kondisi Sampel/Abnormalitas : Normal  
 No. Urut Sampel : 235  
 Kode Sampel : A. Sindang  
 Berasal dari : BBWSS II  
 Diambil oleh : Staf BBWSS VII  
 (Pengambilan Sampel Tanggung jawab Konsumen)  
 Diambil/Diterima tanggal : 14 Mei 2011/18 Mei 2011  
 Tgl. Pengujian di Lab : 18 Mei 2011  
 No. Lab : 1770/S-A/V/2011

**HASIL UJI**

| No                     | Parameter  | Satuan | Kadar maksimum<br>Air Sungai<br>Kelas I | Hasil   | Metode Pemeriksaan  |
|------------------------|--|--------|---|---------|---------------------|
| <b>FISIKA</b>          |  |        |   |         |                     |
| 1                      | Temperatur*<br><i>(diLaboratorium)</i>                 | °C     | Deviasi ±3 °C                           | 21,9    | SNI 06-6989.23-2004 |
| 2                      | Zat padat terlarut                                     | mg/L   | 1500                                    | 45      | SNI 06-6989.27-2004 |
| 3                      | Zat padat tersuspensi                                  | mg/L   | 50                                      | 17,9    | SNI 06-6989.3-2004  |
| <b>Kimia Anorganik</b> |  |        |   |         |                     |
| 1                      | pH *<br><i>(diLaboratorium)</i>                        | #      | 6 - 9                                   | 6,01    | SNI 06-6989.11-2004 |
| 2                      | Besi terlarut<br><i>(Fe) *</i>                         | mg/L   | 0,3                                     | 0,0387  | SNI 6989.4-2009     |
| 3                      | Mangan terlarut<br><i>(Mn) *</i>                       | mg/L   | 0,1                                     | 0,0243  | SNI 6989.5-2009     |
| 4                      | Seng<br><i>(Zn) *</i>                                  | mg/L   | 0,5                                     | 0,3048  | SNI 6989.7-2009     |
| 5                      | Cadmium<br><i>(Cd) *</i>                               | mg/L   | 0,1                                     | <0,0032 | SNI 6989.16-2009    |
| 6                      | Raksa<br><i>(Hg)</i>                                   | mg/L   | 0,001                                   | ii      | AAS-MVU             |
| 7                      | Timbal<br><i>(Pb) *</i>                                | mg/L   | 0,05                                    | <0,0022 | SNI 6989.8-2009     |
| 8                      | Sulfat<br><i>(SO<sub>4</sub>) *</i>                    | mg/L   | 400                                     | 20,112  | SNI 6989.20-2009    |
| 9                      | Arsen<br><i>(As)</i>                                   | mg/L   | 0,05                                    | ii      | AAS-HVG             |
| 10                     | Selenium<br><i>(Se)</i>                                | mg/L   | 0,01                                    | ii      | AAS-HVG             |
| 11                     | Sianida<br><i>(CN)</i>                                 | mg/L   | 0,02                                    | 0,0011  | Spektrofotometri    |
| 12                     | Fluorida<br><i>(F)</i>                                 | mg/L   | 0,5                                     | 0,0012  | SNI 06-6989.29-2004 |
| 13                     | Klorida<br><i>(Cl) *</i>                               | mg/L   | 600                                     | 3,0     | SNI 6989.19-2009    |
| 14                     | Amonia Bebas<br><i>(NH<sub>3</sub>)</i>                | mg/L   | 0,5                                     | 0,07    | SNI 06-6989.30-2004 |
| 15                     | Nitrat<br><i>(NO<sub>3</sub>)</i>                      | mg/L   | 10                                      | 0,12    | SNI 06-2480.1991    |
| 16                     | Nitrit<br><i>(NO<sub>2</sub>) *</i>                    | mg/L   | 0,06                                    | 0,0205  | SNI 06-6989.9-2004  |
| 17                     | Kebutuhan Oksigen Biokimia<br><i>(BOD<sub>5</sub>)</i> | mg/L   | 2                                       | 1,85    | SNI 6989.72-2009    |
| 18                     | Kebutuhan Oksigen Kimia<br><i>(COD)</i>                | mg/L   | 10                                      | 2       | SNI 6989.2-2009     |
| 19                     | Dissolved Oxygen<br><i>(DO)</i>                        | mg/L   | 6                                       | 2,62    | SNI 06-6989.14-2004 |
| 20                     | Tembaga<br><i>(Cu) *</i>                               | mg/L   | 2                                       | 0,0101  | SNI 6989.6-2009     |
| 21                     | Coalt<br><i>(Co)</i>                                   | mg/L   | 0,2                                     | ii      | SNI 6989.68-2009    |
| 22                     | Sulfida<br><i>(HS)</i>                                 | mg/L   | 0,002                                   | 0,0003  | SNI 6989.70-2009    |
| 23                     | Fosfat<br><i>(PO<sub>4</sub>)</i>                      | mg/L   | 0,2                                     | 0,006   | SNI 06-6989.31-2004 |
| <b>Kimia Organik</b>   |  |        |   |         |                     |
| 1                      | Minyak & Lemak   | µg/L   | 1000                                    | 64      | SNI 06-6989.10-2004 |
| 2                      | Detergen   | µg/L   | 200                                     | 0,02    | SNI 06-6989.10-2004 |
| 3                      | Fitol  | µg/L   | 1                                       | 0,1     | SNI 06-6989.21-2004 |

\*): Terakreditasi      ii) : Tidak terdeteksi      #) : Tidak ada satuan  
 Catatan : Memenuhi persyaratan yang telah ditetapkan berdasar Peraturan Gubernur Sumsel No. 16 Th 2005.

Manager Mutu

Iy. Megawati M.Kes  
NIP. 19581011197912 2001

Palembang, 06 Juli 2011

Nurul Padillah, S.Si  
NIP. 19800908 200312 2003

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX VIII**  
Sampling Documentation

**SAMPLING DOCUMENTATION**

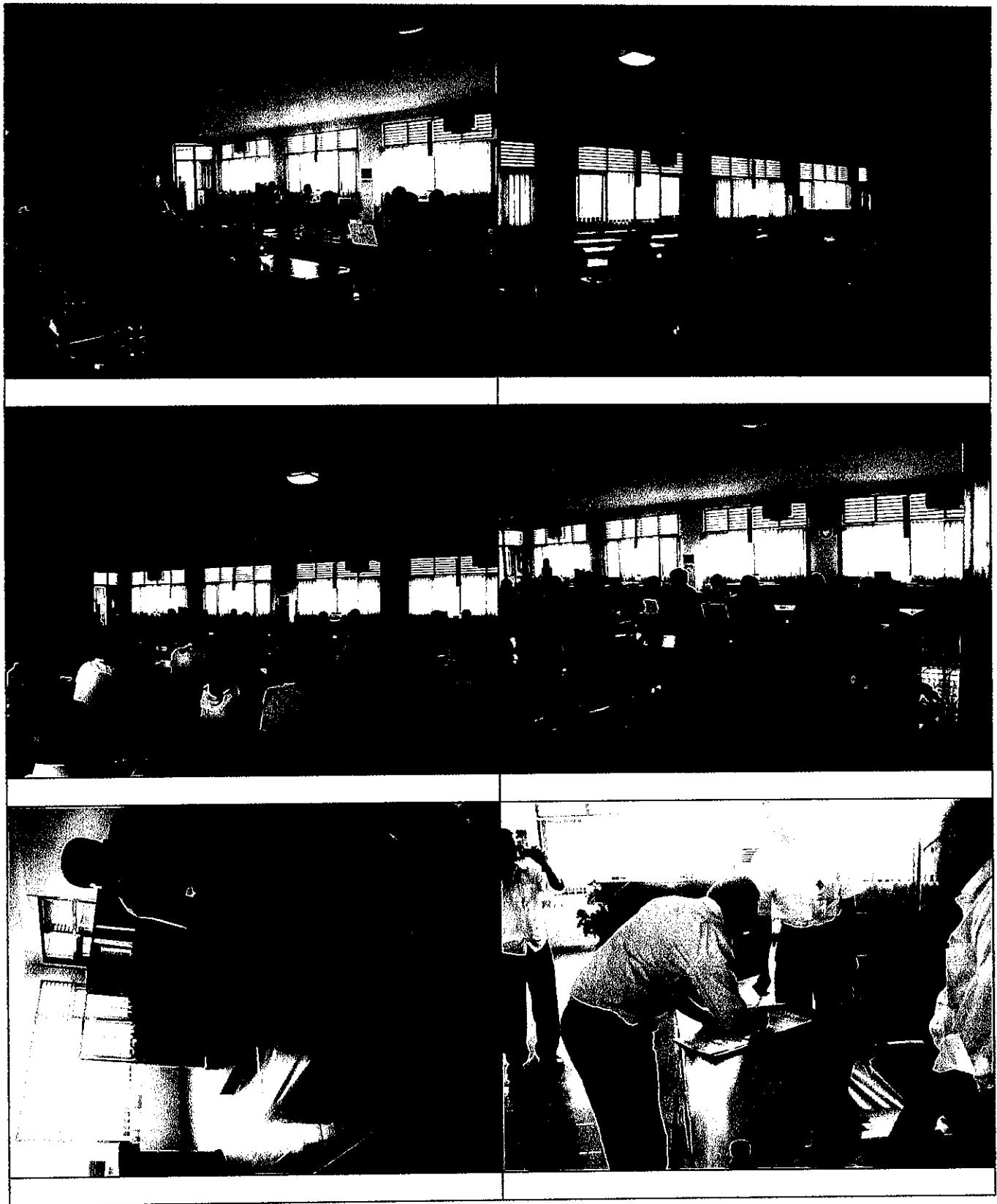
**ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)**  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX IX**

Picture/Documentation of Document Discussion Meeting of Environmental Impact Assessment, Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL).

**DISCUSSION MEETING DOCUMENTATION OF ENVIRONMENTAL IMPACT ANALYSIS (AMDAL), ENVIRONMENTAL MANAGEMENT PLAN (RKL) AND ENVIRONMENTAL MONITORING PLAN (RPL) DOCUMENTS**



**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII  
ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUNG AREA (13,550 HA)**

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX X**

Administrative Map of OKU Timur and OKI Districts

ADMINISTRATION MAP OF  
DISTRICT OKU TIMUR

DISTRICT OGAN ILIR

104°45'

104°30'

104°15'

104°00'

103°45'

103°30'

103°15'

103°00'

102°45'

102°30'

102°15'

102°00'

101°45'

101°30'

101°15'

101°00'

100°45'

100°30'

100°15'

100°00'

099°45'

099°30'

099°15'

099°00'

098°45'

098°30'

098°15'

098°00'

097°45'

097°30'

097°15'

097°00'

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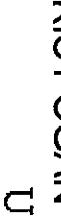
057°30'

057°15'

104°30' 105°00' 105°30' 106°00'  
4°00' 3°30' 3°00' 2°30'

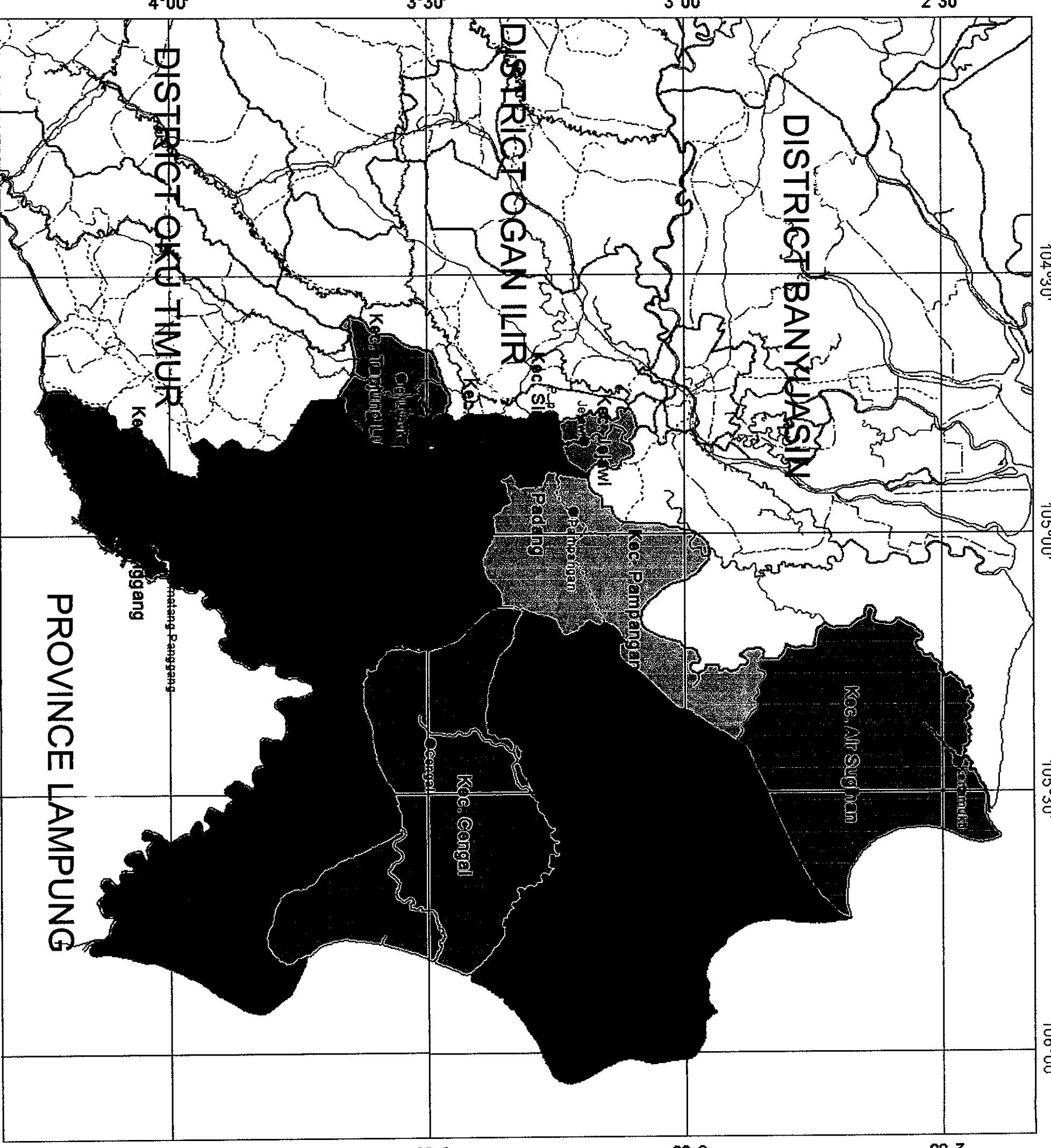
105°00' 105°30' 106°00'  
3°00' 2°30'

ADMINISTRATION MAP OF  
DISTRICT OGAN KOMERING ILIR



0 12 24 36 48 60 Km

Scale 1 : 1.200.000



ADMINISTRATION AREA :

- [Solid black square] Air Sugihan
- [Solid black rectangle] Cengal
- [Square with diagonal line] Jejawi
- [Solid black triangle] Kayu Agung
- [Solid black square] Lempuing
- [Solid black rectangle] Mesuji
- [Solid black square] Pampangan
- [Solid black rectangle] Pedamaran
- [Solid black square] Pematang Panggang
- [Solid black rectangle] Sirah Pulau Padang
- [Solid black square] Tanjung Lubuk
- [Solid black rectangle] Tulung Selapan

Source :  
- Data Digital Wilayah Administrasi Sumsel.  
skala 1 : 250.000

104°30'

105°00'

105°30'

106°00'

BAPPEDA Sumatera Selatan

PROVINCE LAMPUNG

DISTRICT OKU TIMUR

DISTRICT BANYUASIN

DISTRICT OGAN KOMERING ILIR

ENVIRONMENTAL IMPACT ASSESSMENT  
FOR IRRIGATION DEVELOPMENT AT LEMPUING AREA (13,500 HA)  
**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

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**APPENDIX XI**

Biodata List of Composer Team of Environmental Impact Assessment  
and Competence Sertificate

**Surat Pernyataan  
Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan di bawah ini:

Nama : Ir. Satria Jaya Priatna, MS

Alamat : Jl. Netar Jaya No. 003 RT 33 8 Ilir Kenten Palembang

Menyatakan bahwa saya benar-benar ikut dalam penyusunan Dokumen AMDAL Rencana Pembangunan Saluran Irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur, Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung jawab

Palembang, Mei 2011  
Yang membuat pernyataan



Ir. Satria Jaya Priatna, MS

## **DAFTAR RIWAYAT HIDUP**

Nama : Ir. Satria Jaya Pariatna, MS  
Tempat/Tgl. Lahir : Palembang, 15 Januari 1964  
Agama : Islam  
Tempat Tinggal : Jl. Netar Jaya No. 003 RT 33 8 llir  
Kerten Palembang (Phone: 0711- 822534)  
HP: 0816386672  
Email : sjpriatna@gmail.com  
Pekerjaan : Dosen tetap Jurusan Tanah Fakultas  
Pertanian Unsri.Inderalaya.  
Pangkat/Jabatan/Gol : Penata Tk I / Lektor Kepala/ IVa

### **A. Pendidikan Terakhir :**

1. Sarjana Pertanian, Pada Jurusan Tanah Fakultas Pertanian Universitas Sriwijaya Palembang, Tahun 1987.
2. Magister Sains, bidang Konservasi dan Reklamasi Tanah dan air, pada Fakultas Pascasarjana Universitas Padjadjaran Bandung. Tahun 1993.
3. Kandidat Doktor Ilmu Lingkungan pada Program Pasca Sarjana Universitas Sriwijaya, Terdaftar, September 2007.

### **B. Pengalaman Kursus/ Pelatihan Bidang Lingkungan :**

1. Kursus Analisis Mengenai Dampak Lingkungan (Amda A) pada Lembaga Ekologi Universitas Padjadjaran Bandung, Tahun 1992.
2. Kursus Pelatihan Penyusun Amdal, pada Pusat Penelitian Lingkungan Hidup, PPLH Unsri, Tahun 2008.
3. Pelatihan Teknologi Pengambilan dan Pengiriman Contoh Limbah Cair (TPLC) Angkatan II, di Balai Penelitian dan Pengembangan Industri Palembang. Maret 1995,
4. Pelatihan Pendidikan Perencanaan dan Pengelolaan Lingkungan Dalam Pembangunan Berkelanjutan, PPLH Unsri. September 1993. Palembang.
5. Kursus Dasar Analisa Limbah Cair Industri Karet, di Balai Industri Palembang. Juli 1995.
6. Kursus singkat mengenai Metode Penyusunan Pelaporan AMDAL, di Bogor. Tahun 1992.

**C. Pengalaman Pendidikan/ Kursus/ Organisasi:**

1. Short Course Bidang Experimental Design kerjasama Unsri dengan BKS USAID di Palembang. 1987.
2. Short Course Penyegaran Tenaga Ahli Konservasi Tanah dan Air di Institut Pertanian Bogor. Tahun 1990.
3. Kursus Singkat Bioteknologi bidang Biologi Tanah Tentang Mikoriza Vasicular Abuscular di Institut Pertanian Bogor. Tahun 1990.
4. Pengurus Perhimpunan Teknik Tanah dan Air (Perteta) cabang Sumatra Selatan, 1993 - sampai sekarang.
5. Sekretaris dan Anggota Himpunan Ilmu Tanah (HITI) Cabang Sumatera. Tahun 1990 – 2007.
6. Sekretaris Umum Masyarakat Pertanian Organik (Maporina) Provinsi Sumatera Selatan, tahun 2004-2007.
7. Tenaga Pengajar dalam bidang: Konservasi tanah dan air, Hidrologi, Irrigasi dan Drainase; Dasar-dasar Ilmu Tanah; Perancangan Percobaan pada Fakultas Pertanian Universitas Sriwijaya. 1990-sekarang.

**D. Pengalaman Pekerjaan Bidang Lingkungan (AMDAL) :**

1. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Kakao/ Penyusunan PEL, RKL dan RPL PT Panjiwaringin (PT Astra Agro Niaga) Kabupaten Lebak Propinsi Jawa Barat. 1992.
2. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Teh/ Penyusunan PEL, RKL dan RPL PT Sankawangi (PT Astra Agro Niaga) Kabupaten Bandung Propinsi Jawa Barat. 1992.
3. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Kakao/ Penyusunan PEL, RKL dan RPL, PT Topasari (PT Astra Agro Niaga) Kabupaten Lebak Propinsi Jawa Barat. 1992.
4. Koordinator bidang Fisik - Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Teh/ Penyusunan PEL, RKL dan RPL, PT Bantar (PT Astra Agro Niaga) Kabupaten Sukabumi Propinsi Jawa Barat. 1992.
5. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Teh/ Penyusunan PEL, RKL dan RPL, PT Sumber Sari Bumi Pakuan (PT Astra Agro Niaga) Kabupaten Bogor Propinsi Jawa Barat. 1992.

6. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Kelapa Sawit /Penyusunan PIL, RKL dan RPL, PT Laras Astra Kartika (PT. Astra Agro Niaga) Kabupaten Ogan Komering Ulu Propinsi Sumatra Selatan. 1992.
7. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Teh/ Penyusunan PEL, RKL dan RPL, PT Rumpun Sari Medini (PT Astra Agro Niaga) Kabupaten Kendal Propinsi Jawa Tengah. 1992.
8. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Teh/ Penyusunan PEL, RKL dan RPL, PT Bukit Sari (PT Astra Agro Niaga) Kabupaten Bandung Propinsi Jawa Barat. 1992.
9. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Teh/ Penyusunan PEL, RKL dan RPL, PT Rumpun Sari Kemuning (PT Astra Agro Niaga) Kabupaten Karang Anyar Propinsi Jawa Tengah. 1992.
10. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Kakao/ Penyusunan PEL, RKL dan RPL, PT Rumpun Sari Antan III (PT Astra Agro Niaga) Kabupaten Kendal Propinsi Jawa Tengah. 1992.
11. Koordinator bidang Fisik-Kimia dalam studi evaluasi Mengenai Dampak Lingkungan Proyek Perkebunan Kakao/ Penyusunan PEL, RKL dan RPL, PT Rumpun Sari Antan IV (PT Astra Agro Niaga) Kabupaten Banyumas Propinsi Jawa Tengah. 1992.
12. Enviromentalist Asistent, pada Proyek Dam Pengendali Cipanas, kabupaten Sumedang Propinsi Jawa Barat. 1993
13. Enviromentalist Asistent. Pada "Inland Waterway Project in South Sumatra. 1996.
14. Analaisis Dampak Lingkungan (ANDAL), RKL, RPL. Proyek Pencetakan sawah Baru Seluas 17.000 Hektar di Kecamatan Beltanag Kabupaten OKU Propinsi Sumatera Selatan. Pengembangan Proyek Irigasi Komering. 1995. (Anggota Tim).
15. Analisis Dampak Lingkungan (ANDAL), RKL, RPL. Pembangunan Jaringan Pipa Distribusi Gas Bumi di Kotamadya Palembang dan Sekitarnya. Palembang. 1997. (Anggota Tim).
16. Analisis Dampak Lingkungan (ANDAL), RKL, RPL. Perkebunan Karet dan Kelapa sawit PT. Lonsum. 1999 (Anggota Tim).
17. Analisis Dampak Lingkungan (ANDAL), RKL, RPL Pipa GAS. 1999 (Anggota Tim).
18. Ketua Tim Penyusunan AMDAL (ANDAL, RKL,RPL), Perkebunan Kelapa sawit PT. Sumatera Agri Sejahtera di Kabupaten Musi Banyuasin. Tahun 2008

19. Tim Penyusunan AMDAL (ANDAL, RKL,RPL), Perkebunan Kelapa sawit PT. Sumatera Agri Industri di Kabupaten Musi Banyuasin. Tahun 2008 (Anggota Tim).
20. Tim Penyusunan AMDAL (ANDAL, RKL,RPL), Perkebunan Kelapa sawit PT. Tani Andalas Sejahtera di Kabupaten Musi Rawas. Tahun 2008. (Anggota Tim).
21. Tim Penyusunan AMDAL (ANDAL, RKL,RPL), Perkebunan Kelapa sawit PT. Tani Musi Persada di Kabupaten Musi Banyuasin. Tahun 2008. (Anggota Tim).
22. Tim Penyusunan AMDAL Pengembangan Lapangan Golf di areal PTBA Tanjung Enim. Tahun 2008. (Anggota Tim).
23. Tim Penyusunan Revisi AMDAL Pengembangan Eksplorasi Minyak Limau Prabumulih di Areal Prabumulih Kab. Muara Enim Sumsel. Tahun 2008. (Anggota Tim).
24. Tim Pemantauan Lingkungan pada UBEP Pertamina Wilayah Jambi. Tahun 2008-2009. (Anggota Tim/ Koordinator Aspek Tanah)
25. Tim Pemantauan Lingkungan pada UBEP Pertamina Limau Prabumulih. Tahun 2008-sekarang. (Anggota Tim/ Koordinator Aspek Tanah)
26. Tim Pemantauan Lingkungan pada UBEP Pertamina Sorong. Tahun 2008-sekarang. (Anggota Tim/ Koordinator Aspek Tanah)
27. Tim Pemantauan Lingkungan pada PT. Coocophillips Grissik. Tahun 2008-sekarang. (Anggota Tim/ Koordinator Aspek Tanah).
28. Ketua Tim Pemantauan Aspek Tanah pada Areal Revegetasi Pasca Penambangan Batubara PT. Bukit Asam (Persero) Tbk di lokasi Tambang Air Laya (TAL), lokasi Tambang Muara Tiga Besar (MTBU) dan Tambang Banko Barat (BB). Tahun 2008- sekarang.
29. Ketua Tim Penyusunan UKL-UPL Pengembangan Lapangan Minyak dan Gas Terbatas (Migas) PT. Pertamina Unit Bisnis EP LIRIK – Kabupaten Indragiri Hulu, Provinsi Riau. Tahun 2008.
30. Tim Penyusunan UKL-UPL Pemboran Eksplorasi Darat Sumur Cerah-1 Blok Sekayu di Kecamatan Lais Kabupaten Musi Banyuasin Provinsi Sumatera Selatan Star Energy (Sekayu) Ltd. (Anggota Tim) Tahun 2008.
31. Tim Penyusunan AMDAL Pengembangan Lapangan Golf PT. Bukit Asam di Kecamatan Lawang Kidul Kabupaten Muara Enim Provinsi Sumsel. (Anggota Tim). Tahun 2008.
32. Tim Penyusunan Dokumen Upaya Pengelolaan Lingkungan (UKL) dan Upaya Pemantauan Lingkungan (UPL) "Penambahan Pembangunan perkebunan kelapa sawit PT. Golden Blossom Sumatera seluas 2.900 Ha di Kecamatan Abab Kabupaten Muara Enim Provinsi Sumatera Selatan. (Anggota Tim). Tahun 2008.

33. Tim Penyusunan AMDAL Pembangunan Dermaga Batubara Kertapati II di Desa Perajin Kecamatan Banyuasin I Kabupaten Banyuasin Provinsi Sumatera Selatan. (Anggota Tim). Tahun 2009.
34. Tim Penyusunan AMDAL Penambangan Batubara CV. Buana Eltra seluas 1,235 Ha, di Kecamatan Pengandonan Kabupaten OKU Provinsi Sumatera Selatan. (Anggota Tim). Tahun 2009.
35. Tim Penyusunan AMDAL Penambangan Batubara PT. Sriwijaya Bara Priharum seluas 7.447 Ha, di Kecamatan Tanjung Agung dan Kecamatan Lawang Kidul Provinsi Sumatera Selatan. (Ketua Tim). Tahun 2009.
36. Tim Penyusunan AMDAL Pembangunan Dermaga Batubara Kertapati II di Desa Perajin Kecamatan Banyuasin I Kabupaten Banyuasin Provinsi Sumatera Selatan. (Anggota Tim). Tahun 2009.
37. Tim Penyusunan AMDAL Penambangan Batubara PT. Búkit Kendi seluas 671 Ha, di Kecamatan Lawang Kidul dan Tanjung Agung Provinsi Sumatera Selatan. (Anggota Tim). Tahun 2009.

#### **E. Pengalaman Dalam Bidang Penelitian dan Survai Tanah :**

1. Koordinator Tim Survai Penelitian Evaluasi Kesesuaian Lahan Untuk Komoditi Karet pada Areal Perkebunan PT Mincar Jaya di Kecamatan Martapura Kabupaten Ogan Komering Ulu Propinsi Sumatera Selatan. Tahun 1987.
2. Ketua Sub Tim bidang Fisik dan Kimia Tanah pada Studi Kelayakan untuk Komoditi Karet dan Kelapa Sawit pada Areal Perkebunan PT Mutiara Kemilau di Kecamatan Rawas Ilir Musi Rawas Sumatera Selatan. Tahun 1989.
3. Ketua Tim Survai Tanah pada Areal Perkebunan Karet PT Swadaya Coorporation di Kecamatan Cempaka Ogan Komering Ulu Propinsi Sumatera Selatan. Tahun 1989.
4. Anggota Tim Survai Tanah pada Areal Perkebunan Kopi dan Kelapa Sawit PT Agro Palindo Sakti di Kecamatan Lubuk Lancang Betung Kabupaten Musi Banyu Asin Propinsi Sumatera Selatan. Tahun 1988.
5. Tim Peneliti Proyek Kerjasama Pengembangan Teknologi Produksi Tanaman Pangan di daerah Transmigrasi Bingin Teluk dan Kelingi IV C Kabupaten Musi Rawas Propinsi Sumatera Selatan. Tahun 1987 s/d 1988.
6. Tim Survai dan Peneliti Penyusunan Studi Kelayakan Pembangunan Taman Agrowisata Kabupaten Musi Rawas (Survai Potensi Tahun I). Tahun 1996.
7. Tim Peneliti Perencanaan Penanganan Tanaman Eks Terbakar Dengan Metode PRA (Partisipatory Rural Apraisal) di Wilayah Hutan Benakat dan Kabupaten Bangka Propinsi Sumatera Selatan. Tahun 1998.

8. Tim Pembinaan Kelembagaan dan Pengembangan Hutan Kemasyarakatan (HKM) Propinsi Sumatera Selatan. Tahun 1998.
9. *Tim Peneliti Kajian Erosi pada Lahan Marginal Dataran Tinggi Provinsi Sumatera Selatan. (Tahun 2005-2007). Penelitian Dikti.*
10. Ketua Tim Peneliti Studi Kualitas Limbah dan Tanah, Kondisi Awal Lahan Fasilitas Pengolahan Limbah Minyak Bumi Di PPP Klamono-Sorong. Tahun 2009.
11. Ketua Tim Peneliti Terhadap Kajian Kebocoran Minyak Terhadap Pencemaran Tanah Dan Air Di Lokasi Rawa Station Sungai Lilin Kabupaten Musi Banyuasin. Tahun 2009.

Palembang, Februari 2011



Satria Jaya Priatna



IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA

THE NATIONAL ASSOCIATION OF CONSULTING PROFESSIONALS INDONESIAN

KEPUTUSAN MENTERI NEGARA LINGKUNGAN HIDUP NO. 265 TAHUN 2010

TENTANG

PENJUKNAN LEMBAGA SERTIFIKASI KOMPETENSI UNTUK PELAKSANAAN UJI KOMPETENSI DAN SERTIFIKASI KOMPETENSI  
PENYUSUN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP

000444

SERTIFIKAT KOMPETENSI

No. 000415/SKPA/LSK-INTAKINDO/III/2011

SESUAI DENGAN PERATURAN MENTERI NEGARA LINGKUNGAN HIDUP NO. 07 TAHUN 2010  
TENTANG PERSYARATAN KOMPETENSI DALAM PENYUSUNAN DOKUMEN ANALISIS  
MENGENAI DAMPAK LINGKUNGAN HIDUP DAN PERSYARATAN LEMBAGA PELATIHAN KOMPETENSI  
PENYUSUN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP  
IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA DENGAN INI MENYATAKAN BAHWA :

**SATRIA JAYA PRIATNA**

TELAH MEMENUHI SEMUA PERSYARATAN DAN KETENTUAN SERTIFIKASI KOMPETENSI  
PENYUSUN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP,  
SEHINGGA DENGAN DEMIKIAN BERHAK MENDAPATKAN SERTIFIKAT KOMPETENSI SEBAGAI :

Ketua Tim Penyusun Dokumen Amdal

DITETAPKAN DI JAKARTA

TANGGAL .

17 Maret 2011

DEWAN PENGURUS NASIONAL  
IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA

Ir. ERIE HERYADI

KETUA UMUM



No. Registrasi : **K.031.02.11.040.000402**

SERTIFIKAT KOMPETENSI INI BERLAKU SELAMA DUA TAHUN SEJAK TANGGAL DITETAPKAN

**Surat Pernyataan**  
**Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan dibawah ini :

**Nama : Ir. Evi Afiatun, MT**

**Alamat : Jl. Permai 18 No. 15 Kompl. Maper RT.004 RW.008 Mekar Rahayu Bandung**

Menyatakan bahwa saya benar-benar ikut dalam penyusunan dokumen AMDAL rencana Pembangunan Saluran irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur, Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung jawab.

Palembang, Mei 2011

Yang membuat pernyataan



Ir. Evi Afiatun, MT.

**Surat Pernyataan  
Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan di bawah ini:

Nama : Dr. Ir. Yakup Parto, MS

Alamat : Jl. Angkatan 45, Lrg. Harapan Baru No. 4 Lorok-Pakjo, IBI, Palembang.

Menyatakan bahwa saya benar-benar ikut dalam penyusunan Dokumen AMDAL Rencana Pembangunan Saluran Irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur, Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung jawab

Palembang, Mei 2011  
Yang membuat pernyataan



Dr. Ir. Yakup Parto, MS

## CURICULUM VITAE

1. Nama : Dr. Ir. Yakup, M.S.
2. Tempat, Tgl Lahir : Trenggalek, 21 Nopember 1962
3. Agama : Islam
4. Jenis Kelamin : Laki-laki
5. Status : Kawin
6. Alamat : Jl. Angkatan 45, Lrg. Harapan Baru No. 4  
Lorok-Pakjo, Ilir Barat I, Palembang, Sumatera Selatan,  
Telp. 0711-311638, HP. 08159533486.
7. Kantor : Jurusan Budidaya Pertanian, Fakultas Pertanian UNSRI,  
Jl. Palembang-Prabumulih Km 32, Indralaya, Ogan Ilir (OI),  
Sumatera Selatan, Telp. 0711 – 580461.
8. Pendidikan :

| No. | Jenjang        | Bidang          | Tempat                            | Tahun |
|-----|----------------|-----------------|-----------------------------------|-------|
| 1.  | S <sub>1</sub> | Agronomi        | Fakultas Pertanian UNS, Surakarta | 1985  |
| 2.  | S <sub>2</sub> | Ekologi Tanaman | Program Pascasarjana IPB, Bogor   | 1993  |
| 3.  | S <sub>3</sub> | Ekologi Lanskap | Sekolah Pascasarjana IPB, Bogor   | 2007  |

9. Kursus/Pelatihan :

| No. | Bidang                                | Tempat  | Tahun |
|-----|---------------------------------------|---|-------|
| 1.  | Sistem Informasi Geografi (SIG) Dasar | Lab. Penginderaan Jauh dan Kartografi, Jur. Tanah FP IPB, Bogor | 2002  |
| 2.  | Penyusun AMDAL                        | Pusat Penelitian Lingkungan Hidup (PPLH), UNSRI, Palembang      | 2008  |

10. Pengalaman Mengajar/Instruktur :

| No. | Nama dan Tempat  | Tahun           |
|-----|--|-----------------|
| 1.  | Pengajar Program Studi Agronomi, Jurusan Budidaya Pertanian, Fak. Pertanian UNSRI, Palembang - Indralaya                 | 1987 - sekarang |
| 2.  | Pengajar Program Studi Ilmu Tanaman, Program Pascasarjana UNSRI, Palembang   | 1997 - sekarang |
| 3.  | Instruktur Pelatihan Pengendalian Pencemaran Limbah di Lingkungan Masyarakat, Pemda Ogan Komering Ilir (OKI), Kayu Agung | 2000            |
| 4.  | Instruktur Pelatihan Penanganan Limbah Pabrik Kelapa Sawit, Dinas Perkebunan Prop. Sumsel, Palembang                     | 2007            |
| 5.  | Instruktur Pelatihan TOT Sekolah Lapang Iklim Skala Luas, Balai Perlindungan Tanaman Pangan Sumsel, Palembang            | 2007            |
| 6.  | Instruktur Pelatihan Pengelolaan Perkebunan Berwawasan Lingkungan, Dinas Perkebunan Prop. Sumsel, Palembang              | 2008            |

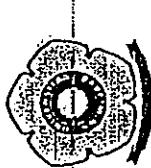
11. Pengalaman Survei/Penelitian :

| No. | K e g i a t a n  | Tahun |
|-----|--|-------|
| 1.  | Anggota Tim Penyusunan Rencana Teknis Pembinaan Unit Pemukiman Transmigrasi Parit I dan Sungai Rambutan - Indralaya, Ogan Ilir – Sumatera Selatan  | 2007  |
| 2.  | Anggota Tim Project Benefit Monitoring and Evaluation (PBME) Survey, Komering Irrigation Project Stage II - Phase 2, OKU Timur – Sumatera Selatan  | 2007  |
| 3.  | Anggota Tim Penyusunan Studi AMDAL Penambangan Besi PT Mandiri Agung Jaya Perkasa, Musi Rawas  | 2007  |
| 4.  | Anggota Tim Penyusunan Studi AMDAL Perkebunan Kelapa Sawit PT Sriwijaya Agri Industri, Musi Banyuasin  | 2008  |
| 5.  | Anggota Tim Penyusunan Studi AMDAL Perkebunan Kelapa Sawit PT Tani Musi Persada, Musi Banyuasin  | 2008  |
| 6.  | Anggota Tim Penyusunan Studi AMDAL Perkebunan Kelapa Sawit PT Sumatera Agri Sejahtera, Musi Banyuasin  | 2008  |
| 7.  | Anggota Tim Penyusunan Studi AMDAL Perkebunan Kelapa Sawit PT Tani Andalas Sejahtera, Musi Rawas   | 2008  |
| 8.  | Anggota Tim Penyusunan Studi AMDAL Perkebunan Kelapa Sawit PT Empat Lawang Agro Perkasa, Empat Lawang  | 2008  |
| 9.  | Anggota Tim Penyusunan Studi AMDAL Perkebunan Kelapa Sawit PT Karsa Kencana Sentosa Tiga, Empat Lawang   | 2008  |
| 10  | Anggota Tim Biologi Studi AMDAL Pembangunan dan Pengembangan Pelabuhan Khusus, Stockpile Batubara & Batu Pecah, Asphalt Mixing Plant Serta Fasilitas Penunjang Lainnya PT Sinar Musi Jaya. Luas 61,09 Ha di Kecamatan Muara Telang, Kabupaten Banyuasin. | 2010  |
| 11  | Anggota Tim Biologi Studi AMDAL Pembangunan Perkebunan dan Pabrik Pengolahan Kelapa Sawit, PT. Cahya Vidi Abadi, Luas 5000 Ha, Kapasitas Pabrik 45 Ton TBS/Jam, di Kecamatan Gelumbang dan Muara Belida Kabupaten Muara Enim.                            | 2010  |

Palembang, Februari 2011

Dr. Ir. Y a k u p, M.S.

DEPARTEMEN PENDIDIKAN NACIONAL  
UNIVERSITAS SRIWIJAYA  
LEMBAKA PENELITIAN  
PUSAT PENELITIAN LINGKUNGAN HIDUP



Menyatakan bahwa :

*Drs. Hj. Yatiqah, M.P.*

telah berhasil menyelesaikan

Pelatihan Penyusun AMDAL Periode 2008

daratanggai : 02 Juni 2008 s/d 03 Juli 2008

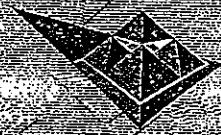
Palembang, 03 Juli 2008

Rektor



Hj. Badia Perizade, M.B.A.

NIP. 130785359



IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA

THE NATIONAL ASSOCIATION OF CONSULTING PROFESSIONALS INDONESIA

KEPUTUSAN MENTERI NEGARA LINGKUPAN HIDUP NO. PERATURAN 2008

INTAKINDO

PENJUKNAN PEMERAGA SERTIFIKASI KOMPETENSI UNTUK PELARANGAN DILAKUKANNYA KOMPETENSI DAN SERTIFIKASI KOMPETENSI  
PENYUSUN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP

000240

SERTIFIKAT KOMPETENSI

000213/SKPA/LSK/INTAKINDO/VII/2010

No.

SESUAI DENGAN PERATURAN MENTERI NEGARA LINGKUNGAN HIDUP NO. PERATURAN 2008  
TENTANG PERSYARATAN KOMPETENSI DALAM PENYUSUNAN DOKUMEN ANALISIS  
MENGENAI DAMPAK LINGKUNGAN HIDUP DAN PERSYARATAN LEMBAGA PELATIHAN KOMPETENSI  
PENYUSUN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP  
IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA DENGAN INI MENYATAKAN BAWAH

YAKUP

TELAH MEMENUHI SEMUA PERSYARATAN DAN KETENTUAN SERTIFIKASI KOMPETENSI  
PENYUSUN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP  
SEHINGGA DENGAN DEWAKTA BERHAK MENDAPATKAN SERTIFIKAT KOMPETENSI SERTA

Ketua Tim Penyusun Dokumen AMDAL

DITETAPKAN DI JAKARTA

TANGGAL

03 Agustus 2010

DEWAN PENGURUS NASIONAL

IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA

H. ERIE HERYADI

KETUA UMUM



No. Registrasi : K1.07.10.016.000208

SERTIFIKAT KOMPETENSI HERLAKU SELAMA 3 (TIGA) TAHUN SETAKT TANGGAL DITETAPKAN

**Surat Pernyataan  
Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan di bawah ini:

Nama : Drs.Kiswadi

Alamat : Komp Villa Angkasa Permai Blk C No 08 Sukarami Palembang

Menyatakan bahwa saya benar-benar ikut dalam penyusunan Dokumen AMDAL Rencana Pembangunan Saluran Irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur, Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung jawab

Palembang, Mei 2011  
Yang membuat pernyataan



## CURICULUM VITAE

|   |                       |   |                                      |
|---|-----------------------|---|--------------------------------------|
| 1 | Name of Personnel     | : | <b>Drs. Kiswadi</b>                  |
| 2 | Place / Date of Birth | : | Magelang, August 20, 1960            |
| 3 | Educations            | : | • S1 ~ Hidrologi UGM Yogyakarta 1986 |
| 4 | Non formal education  | : | -                                    |
| 5 | English Language      | : | Very Good                            |
| 6 | Working Experiences   | : | -                                    |

Year 2008

SID the Coastal Security of Islands District of Nanusa, Kab. Talaud Archipelago.

Year 2007

SID Bog ( 10.000 Ha) Area Bog Jenamas Sub-Province South Barito

Year 2006

Technical Compilation Plan of DR. Sasak 1.000 Ha District of Sajingan, Sub-Province Sambas.

Year 2005

Hydrological Investigation For The Rajamandala HEPP in Republic of Indonesia (1<sup>st</sup> Phase)

Year 2004

Survey Investigasi dan Design ( SID ) D.I. Detail Desain Waduk Lapangan Cibatarua

Year 2004

Measurement of Watercourse In Gelebak Dalam Fortunate Jao Outline Plan for of Drainage And Small Lakes Management Jabodetabek-Bopunjur Area

Year 2003

Detail Desain study Transfer Of Interregional Standard Water River Stream Cibatarua - Cilaki - Cisangkuy.

Year 2002

Detail Desain Intake By Pass Accumulating Basin Ir. Prince Moch. Noor.

Year 2001

Consulting services for Institutional Strengthening and Training for DAM safety Project Stage II

Year 2000

Hydrological Investigation and meteorological Observation For The Detailed Design of Upper Cisokan Pumped Storage Hydroelectric Power Plant Project

Year 1999

Supervisi Konstruksi Rehabilitasi Bendungan Wonogiri, Gebyar, Pacal Prijetan ( Paket SR – C13 )

Tahun 1999

Study Development DRAUGHT River Gong Rp. 428.226.000

Year 1999

Detail Desain Embung Rambu Rp. 255.567.000,-

Year 1998

Detail Desain Tertiary Network and PULB Area Irrigation ( DI ) Bonuk 500 Ha Rp. 345.552.900,

Year 1998

Supervision Completion monitoring and also the Make-Up Of Network Arrange Water Area Bog In Order To System Development Effort Agriculture Ebb Inwroughtly Rp. 300.670.000,

Year 1997

Supervision Repair of Irrigation countryside ( PID) for the width of 18000 Ha Rp. 448.415.000,

Year 1996

Desain Rehabilitate Network Area Irrigation Beco and Area Irrigation Seical Under Rp. 164.646.000,

Year 1996

Model Test planning Barricade Area Irrigation Sangkub Rp. 697.230.000,

Year 1995

Consulting Services For Dam Safety Project Institutional Strengthening & Training Component Rp. 5.113.190.000,-

Year 1994

Compilation of Masterplan Operation of Floods Rp. 180.175.000,

Year 1994

Especial And Planning Network measurement 450 Ha Tertiary Network 1.385 Ha. in Laclo To The, Province Timor East Rp. 113.950.000,

Year 1993

Study Balance Irrigate in the Middle Sub-Province Lombok island and Lombok Island East, West Nusa Tenggara Rp. 465.020.000,

Year 1993

Study Hidrology Hidometri and Tracer Test at Industrial Location Plan of Cement in Kebumen, Central Java Rp. 36.670.500,

This Curriculum vitae is I made upon the truth and responsibility.

Medan, December ,2010

Drs. Kiswadi  
Irrigation Engineer



# Sertifikat

Nomor : 01022-1711/BSA-HATHI/01/2009

HIMPUNAN AHLI TEKNIK HIDRAULIK INDONESIA

Memberikan Sertifikat Keahlian Sumber Daya Air (SDA)

Kepada :

**Drs. Kiswadi**  
KTA : 113488

Kualifikasi :

Profesional Madya SDA

Dengan Matrik Angka Kredit :

PENDIDIKAN DAN PELATIHAN

KARYA ILMIAH

PENUNJANG

| Total I | 63,5 |
|---------|------|
|---------|------|

| PROFESIONALISME                | Pengembangan Wilayah Sungai | Sungai dan Denau | Bendung dan Bendungan | Irigasi dan Drainase Lahan | Drainase Perkotaan dan Permukiman | Rawa         | Pantai dan Pelabuhan | Tenaga Air | Total        |
|--------------------------------|-----------------------------|------------------|-----------------------|----------------------------|-----------------------------------|--------------|----------------------|------------|--------------|
| Perencanaan                    | 21,0                        | 41,5             | 65,5                  | 29,5                       | 0,0                               | 158,0        | 0,0                  | 0,0        | 315,5        |
| Pelaksanaan                    | 0,0                         | 26,0             | 0,0                   | 0,0                        | 14,5                              | 40,0         | 0,0                  | 0,0        | 80,5         |
| Pengawasan                     | 0,0                         | 0,0              | 0,0                   | 0,0                        | 0,0                               | 0,0          | 0,0                  | 0,0        | 0,0          |
| Pengoperasian dan Pemeliharaan | 0,0                         | 0,0              | 0,0                   | 0,0                        | 0,0                               | 0,0          | 0,0                  | 0,0        | 0,0          |
| <b>Total II</b>                | <b>21,0</b>                 | <b>67,5</b>      | <b>65,5</b>           | <b>29,5</b>                | <b>14,5</b>                       | <b>198,0</b> | <b>0,0</b>           | <b>0,0</b> | <b>396,0</b> |

Total Angka Kredit : 459,5

Sertifikat ini berlaku sampai dengan : 23 Januari 2012

Jakarta : 23 Januari 2009

**Ir. Iwan Nursyirwan, Dip HE.**  
Ketua Umum



**Ir. Adi Sarwoko, Dip HE., PU-SDA**  
Ketua BSA

Catatan :

Professional Utama SDA angka kredit > 700  
Professional Madya SDA angka kredit 400 - 700  
Professional Muda SDA angka kredit 150 - 400  
Professional Pemula SDA angka kredit < 150

Akkreditasi LPJK : No.12 /AKR/LPJK/D/III/2003

**Surat Pernyataan  
Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan di bawah ini:

Nama : Drs. Mulyanto, MA  
Alamat : Jl. Gelora Gang 6 no 41 32 ilir IB II Palembang

Menyatakan bahwa saya benar-benar ikut dalam penyusunan Dokumen AMDAL Rencana Pembangunan Saluran Irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur, Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung jawab

Palembang, Mei 2011  
Yang membuat pernyataan



Drs. Mulyanto, MA

# CURRICULUM VITAE

## Drs. Mulyanto, MA

Nama Lengkap : Drs. Mulyanto, MA  
Tempat dan Tanggal Lahir : Batang, 22 Nopember 1956

Alamat Rumah : Jalan Gelora Gg. VI No. 41 RT. 34 Kelurahan 32 Ilir Palembang, 30145

### Riwayat Pendidikan

| Tempat Pendidikan   | Kota       | Jurusan             | Tahun |
|---------------------|------------|---------------------|-------|
| AKUB (sarjana muda) | Yogyakarta | Uang dan Bank       | 1980  |
| UGM (S 1)           | Yogyakarta | Filsafat            | 1981  |
| UI (S 2)            | Jakarta    | Antropologi Ekologi | 1991  |

### Pengalaman Penataran dan Penelitian :

| No. | K e g i a t a n  | Tahun       |
|-----|--|-------------|
| 1.  | Peserta, Masalah Perlindungan Anak, BKSN RI, Jakarta   | 2000        |
| 2.  | Nara Sumber & Fasilitator, Pelatihan Peningkatan Peran Anggota DPRD Kab/Kota se Sumatera Selatan, Hotel Swarnadwipa, Palembang   | 2000        |
| 3.  | Nara Sumber, Pelatihan Kepemimpinan Demokratis Kepala Desa se Sumatera Selatan, Hotel Swarnadwipa, Palembang   | 2000        |
| 4.  | Peserta, Workshop on Promoting National Network on Ageing and Development Issues in Indonesia, Yogyakarta  | 2002        |
| 5.  | Peserta, Penyusunan Plan of Action (PoA) Kampanye Terpadu Sahabat Tingkat Kabupaten, Jhon Hopskin University, Hotel Sheraton, Jakarta  | 2002        |
| 6.  | Peserta, Human Rights Training Rights of Child, Kerjasama AusAID (Australia) dengan Depkeh dan HAM RI, Palembang   | 2003        |
| 7.  | Nara Sumber, Participatory Rural Appraisal : Suatu Metode Pemberdayaan Masyarakat, Pelatihan Petugas Sosial, Dinas Kesejahteraan Sosial Provinsi Sumatera Selatan, 3 Angkatan, Palembang   | 2004 & 2005 |
| 8.  | Nara Sumber, Pemberdayaan dan Peran serta Masyarakat dalam Penanggulangan Penyalahgunaan Narkob, Dinas Kesejahteraan Sosial Provinsi Sumatera Selatan, 4 Angkatan bagi Petugas Kelurahan, Kecamatan, Tokoh Masyarakat dan Organisasi Kemasyarakatan, Palembang | 2004        |
| 9.  | Anggota Tim Teknis pada BAPELDA Provinsi Sumatera Selatan, Palembang   | 2005 – 2006 |

|     |   |      |
|-----|---|------|
| 10. | Pelatihan Pra Tugas P2KP-3, Cipanas   | 2006 |
| 11. | Seminar Nasional Komunitas Adat Terpencil, Departemen Sosial RI, Jakarta  | 2006 |
| 12. | Seminar Nasional Komunitas Adat Terpencil, Departemen Sosial RI, Hotel Golden Boutige, Jakarta  | 2006 |
| 13. | Peserta Pelatihan Pengentasan Kemiskinan Pedesaan melalui Kasus Sukses Replikasi, Kerjasama PPCI dengan Handicape Internasional Hotel Jayakarta, Lombok | 2007 |
| 14  | Kursus AMDAL Penyusun, Pusat Studi Lingkungan Hidup Universitas Sriwijaya   | 2009 |

### Pengalaman Penelitian

| No. | Uraian   | Tahun       |
|-----|--|-------------|
| 1.  | Ketua Tim, Pengkajian Pemberdayaan Masyarakat Terasing (Komunitas Adat Terpencil) di Provinsi Sumatera Selatan, Kerjasama Kanwil Departemen Sosial dengan Universitas Sriwijaya. Pengkajian ini membahas kondisi kehidupan masyarakat terasing dalam upaya pemberdayaan sebagai usaha untuk peningkatan kesejahteraannya sesuai dengan habitatnya. | 1995 – 1999 |
| 2.  | Ketua Tim, Studi Kelayakan Komunitas Adat Terpencil di Provinsi Sumatera Selatan, Kerjasama Dinas Kesejahteraan Sosial Provinsi Sumatera Selatan (Depsos RI) dengan Instansi Terkait. Studi membahas upaya pengentasan KAT dari keterisoliran dan mengupayakan kesejahteraan kehidupan mereka.   | 2002 – 2006 |
| 3.  | Anggota Peneliti, Community Developmnt PT. Timah Bangka, Kerjasama PT. Timah Bangka dengan Universitas Sriwijaya. Mengkaji potensi dan pengembangan usaha masyarakat sesuai potensi dan harapan masyarakat di sekitar PT. Timah Bangka   | 2000        |
| 4.  | Anggota Peneliti, Community Developmnt Masyarakat sekitar PT. Tambang Batubara Bukit Asam. Kerjasama PT. BA dengan Universitas Sriwijaya. Melakukan identifikasi potensi dan pengembangan usaha ekonomi produktif masyarakat di sekitar PT. BA.  | 2000        |
| 5.  | Peneliti Utama, Trafficking Anak Perempuan di Palembang Sumatera Selatan. (Masri Singarimbun Research Award III, Pusat Penelitian Kependudukan UGM). Melakukan penelitian terhadap fenomena penjualan anak perempuan yang dijadikan pelacur di Palembang   | 2000/ 2001  |
| 6.  | Tim Peneliti, Identifikasi Profil Perdesaan dan Perkotaan di Provinsi Kepulauan Bangka Belitung. Mengidentifikasi potensi pedesaan dan perkotaan dan memetakan wilayah sesuai dengan potensi dan pertumbuhannya  | 2002        |
| 7.  | Peneliti Utama, Evaluasi Pelaksanaan Otonomi Daerah di Kabupaten Bangka, Provinsi Kepulauan Bangka Belitung. Kerjasama dengan The Asia Foundation. Melakukan pengakajian pelaksanaan otonomi daerah mulai dari aspek pelayanan, sumberdaya manusia, penganggaran dan kewilayahan.  | 2003 – 1004 |

|     |  |             |
|-----|--|-------------|
| 8.  | Anggota Peneliti, Penyusun Rençana Umum Tata Ruang Wilayah Kabupaten Musi Rawas, Bidang Kependudukan dan Sosial Budaya, Baliteks Universitas Sriwijaya   | 2004        |
| 9.  | Peneliti Utama, Pengkajian Pemetaan dan Pendataan Penyalahgunaan Narkoba di Provinsi Sumatera Selatan, Biro Kesra dan Pemberdayaan Perempuan, Sekretariat Provinsi Sumatera Selatan. Melakukan pendataan dan pemetaan penyebaran, penyalahgunaan narkoba di Sumsel.                            | 2004        |
| 10. | Anggota Peneliti, Studi Kelayakan Pemekaran kabupaten Empat Lawang dan Kabupaten Lahat, Kerjasama Baliteks Uiversitas Sriwijaya dengan Pemkab Lahat. Mengkaji kelayakan pemekaran kabupaten Lahat menjadi dua kabupaten yaitu Kabupaten Induk Lahat dan Kabupaten Empat Lawang.                | 2005        |
| 11. | Peneliti Bidang Sosial dan Budaya, Penyusunan Masterplan Lumbung Energi Sumatera Selatan, Kerajasama Universitas Sriwijaya dengan Pemprov Sumsel). Mengkaji aspek sosial, budaya, ketenagakerjaan dan dampak sosial lainnya dengan adanya eksploitasi sumber-sumber energi di Sumatera Selatan | 2005        |
| 12. | Peneliti Utama Anak Dalam Perlindungan Khusus, Kasus Anak Dalam Konflik Hukum di LP Anak Palembang   | 2006        |
| 13. | Anggota Tim Evaluasi Kinerja Pemerintah Provinsi Sumatera Selatan. Mengkaji isu-isu penting daerah yang terkait secara nasional dan kondisi capaian kinerja pemerintah provinsi. Kerjasama Bappenas – Pasca Sarjana Unsri  | 2006 – 2008 |
| 14. | Anggota Tim Penyusunan UKL-UPL Penambangan Batubara seluas 179 Ha di Pulau Panggung, Muara Enim  | 2008        |
| 15. | Anggotan Tim Penyusunan UKL-UPL Perumahan Citra Grand City, Kelurahan Talang Kelapa, Palembang   | 2008        |
| 16. | Tenaga Ahli Sosialisasi Program Pengentasan Kemiskinan di Perkotaan (P2KP) KMW 10 Provinsi Sumatera Selatan dan Kep. Babel   | 2006 – 2007 |
| 17. | Tenaga Ahli Kebijakan Publik Program Pengentasan Kemiskinan di Perkotaan (P2KP) KMW 10 Provinsi Sumatera Selatan dan Kepulauan Bangka Belitung.  | 2007 – 2009 |
| 18. | Anggota Tim Penyusunan AMDAL Penambangan Batubara Bidang Sosekbud dan Kesmas di Simpang Sender, Kab. OKU Selatan   | 2008/ 2009  |
| 19. | Anggota Tim UKL-UPL Pembangunan Jaringan Transmisi SUTT 150 kv, Bidang Sosekbud dan Kesmas Lokasi Kab. Muara Enim – Kab. Lahat.  | 2009        |
| 20. | Anggota Tim Sosekbud UKL-UPL Kegiatan Pengeboran Sumur Eksplorasi Kalisa, Karamba, Ragi dan Raut, PT. Medco E & P di Kabupaten Musi Banyuasin dan Kabupaten Banyuasin.   | 2009        |
| 21. | Anggota Tim Sosekbud. Pemantauan RKL & RPL Pertamina – HESS Jambi Merang.  | 2009        |
| 22. | Anggota Tim Penyusun AMDAL Reklamasi Das Sungai Sekanak, Sungai Buah, Sungai Bendung Kota Palembang. Bidang Sosekbud dan Kemas Tahun.  | 2009        |

## Daftar Karya Ilmiah

| Nº. | Judul Tulisan  | Tahun | Diterbitkan  |
|-----|--|-------|--|
| 1.  | Analisis Segregasi Kelompok Etnis dan Kelas Sosial di Sumatera Selatan   | 2003  | Konferensi nasional Kedua Kesejahteraan Sosial – Bali          |
| 2.  | Melacur Demi Hidup : Fenomena Perdagangan Anak Perempuan di Palembang  | 2004  | Buku : Pusat Studi Kependudukan & Kebijakan UGM                |
| 3.  | Pengembangan Sumberdaya Sosial Dalam Masyarakat.   | 2004  | Jurnal. Media Sosiologi, PS Sosiologi FISIP – Unsri            |
| 4.  | Model Pengembangan Anak Dalam Perlindungan Khusus (Studi Kasus di Provinsi Sumatera Selatan)   | 2005  | Konferensi Nasional Ketiga Kesejahteraan Sosial – Bukit Tinggi |
| 5.  | Studi Kehidupan Komunitas Adat Terpencil "Orang Aur dan Orang Belanti" di Kecamatan Pedamaran Kabupaten Ogan Komering Ilir – Provinsi Sumatera Selatan | 2006  | PIKAT – Departemen Sosial RI                                   |

Palembang, November 2010

  
Drs. Mulyanto, MA

DEPARTEMEN PENDIDIKAN NASIONAL  
UNIVERSITAS SRIWIJAYA  
LEMBAGA PENELITIAN

PUSAT PENELITIAN LINGKUNGAN HIDUP

Menyatakan bahwa

Drs. Mulyanto, MA.

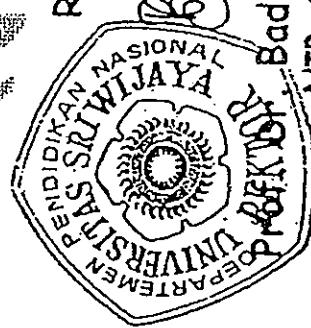
Telah berhasil menyelesaikan

Pelatihan Penyusun AMDAL Periode I Tahun 2009

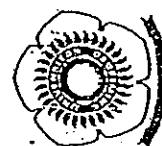
dari tanggal : 02 Februari 2009 s/d 06 Maret 2008

Palembang, 06 Maret 2009

Rektor



Badia Perizade, MBA.  
NIP. 130785359



**Surat Pernyataan  
Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan di bawah ini:

Nama : Dr. Indra Yustian, M.Si

Alamat : Jl. S Hasanuddin I RT 36 RW 11, Kel. Karya Baru, Kec. Sukarame  
Palembang

Menyatakan bahwa saya benar-benar ikut dalam penyusunan Dokumen AMDAL Rencana  
Pembangunan Saluran Irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur,  
Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung  
jawab

Palembang, Mei 2011  
Yang membuat pernyataan



Dr. Indra Yustian, M.Si

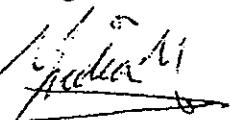
## Curriculum Vitae

|   |  |                                  |
|---|--|----------------------------------|
| <b>Nama</b>                                 | <b>Indra Yustian</b>   |                                  |
| <b>Tanggal Lahir</b>                        | <b>26 Juli 1973 di Jakarta</b>   |                                  |
| <b>Alamat</b>                               | Jalan S. Hasanudin I, Rt.36 Rw. 11, Kelurahan Karya Baru, Kec. Alang-Alang Lebar Palembang- Indonesia.<br>HP: +62 819 333 58 638   |                                  |
| <b>Pendidikan</b>                           | <p>2003-Mei 2007, Georg-August University of Goettingen, Goettingen S3 (Doktor) dalam bidang Conservation Biology (<i>Dr. rer. nat.</i>)</p> <ul style="list-style-type: none"> <li>• <i>Dissertasi:</i> Ecology and Conservation Status of <i>Tarsius bancanus saltator</i> on Belitung Island, Indonesia.</li> </ul> <p>1999 – Feb 2002, Universitas Indonesia, Jakarta<br/>S2 (Master) - Biologi Konservasi</p> <ul style="list-style-type: none"> <li>• Lulus dengan IPK 3,5 (skala maksimum 4)</li> <li>• <i>Master Thesis:</i> Kepadatan populasi relatif dan pohon tempat tidur <i>Tarsius dianae</i> Niemitz et al. 1991 pada beberapa habitat yang terpengaruh aktivitas manusia di Taman Nasional Lore Lindu, Sulawesi.</li> </ul> <p>1991 – Ags 1996, Universitas Sriwijaya, Palembang<br/>S1 (Sarjana) - Biologi</p> <ul style="list-style-type: none"> <li>• Lulus dengan IPK 3,75 (skala maksimum 4), predikat <i>Cum Laude</i></li> <li>• <i>Skripsi:</i> Struktur dan Komposisi Vegetasi di Bukit Sulap, Sumatera Selatan</li> </ul> |                                  |
| <b>Pekerjaan</b>                            | 1997 – sekarang<br>Dosen (Lektor)  | Universitas Sriwijaya, Palembang |
|   | <ul style="list-style-type: none"> <li>• Mengajar pada mata kuliah Ekologi Hewan, Biologi Umum, Ekowisata, Analisis Vegetasi, Biologi Prilaku, Prilaku Hewan dan Biologi Konservasi.</li> <li>• Aktif sebagai Tim Ahli Biologi Lingkungan pada Pusat Penelitian Lingkungan Hidup / PPLH Universitas Sriwijaya. (2007- sekarang)</li> </ul>   |                                  |
| <b>Grants/<br/>Awards</b>                   | <ul style="list-style-type: none"> <li>• 2006: Bantuan Penelitian dari The Rufford Maurice Laing Foundation, Rufford Small Grants for Nature Conservation. Judul: <i>Population density and the conservation status of Belitung's Tarsier in Belitung Island, Indonesia.</i></li> <li>• 2003 – 2007: Beasiswa S3 dari DAAD (Dinas Pertukaran Pelajar Jerman).</li> <li>• 1999 - 2002: Beasiswa S2 dari DUE-like Project-DIKTI untuk Jurusan Biologi, FMIPA Universitas Sriwijaya.</li> <li>• 1998: Bantuan penelitian Dasar dari UNSRI tentang Bank Biji dalam tanah di Pulau Borang, Sumatera Selatan dari Universitas Sriwijaya (Bersama Dra. Vauziah, M.Si.)</li> </ul>   |                                  |
| <b>Kursus/<br/>Pelatihan/<br/>Lokakarya</b> | <ul style="list-style-type: none"> <li>• Pelatihan Kajian Lingkungan Hidup Strategis, Pusat Penelitian Sumber Daya Alam dan Lingkungan Universitas Padjajaran, Bandung, 10-12 November 2010.</li> <li>• Simposium dan Workshop Pengelolaan Tailing, PT. Freeport McMoRan Indonesia, Timika-Papua, 18-19 November 2009.</li> </ul>  |                                  |

|                                    |   |
|------------------------------------|---|
|                                    | <ul style="list-style-type: none"> <li>• Symposium dan Workshop tentang Future Forestry: Reconciling Competing Demands and Meeting the Challenges of Global Changes, Goettingen University, Germany, 21 September - 02 October 2009.</li> <li>• Pelatihan Penyusun AMDAL, Kerjasama PPLH-UPPM FP dan Prodi Peng. Lingkungan Pascasarjana UNSRI, Palembang, 2 Juni-3 Juli 2008.</li> <li>• Lokakarya Uji Coba 1-Siklus Penjaminan Mutu, Universitas Sriwijaya, 23 November 2007.</li> <li>• Lokakarya Akreditasi dan Penjaminan Mutu, Universitas Sriwijaya, 21-22 Nov 2007</li> <li>• Pelatihan &amp; Lokakarya Manajemen Mutu Tepadu, Univ. Sriwijaya, 2007.</li> <li>• Panitia pada Pelatihan dan Lokakarya Manajemen Industri ISO 9000, PPLH – Universitas Sriwijaya, Palembang, 1999.</li> <li>• Pelatihan AMDAL - A, Kerjasama APRIN &amp; PPLH, Palembang, 1994.</li> </ul>   |
| Pengalaman dalam bidang Lingkungan | <ul style="list-style-type: none"> <li>• Anggota Tim Biologi Studi AMDAL Pembangunan dan Pengembangan Pelabuhan Khusus, Stockpile Batubara &amp; Batu Pecah, Asphalt Mixing Plant Serta Fasilitas Penunjang Lainnya PT Sinar Musi Jaya. Luas 61,09 Ha di Kecamatan Muara Telang, Kabupaten Banyuasin. September 2010.</li> <li>• Anggota Tim Biologi Studi AMDAL Pembangunan Perkebunan dan Pabrik Pengolahan Kelapa Sawit, PT. Cahya Vidi Abadi, Luas 5000 Ha, Kapasitas Pabrik 45 Ton TBS/Jam, di Kecamatan Gelumbang dan Muara Belida Kabupaten Muara Enim, Sumatera Selatan. Agustus 2010.</li> <li>• Anggota Tim Biologi Studi UKL-UPL Kegiatan Pemboran Eksplorasi Gas Metana Batubara di Kecamatan Lawang Kidul Kabupaten Muara Enim oleh Arrow Energy (Tanjung Enim) Pte. Ltd. Juni 2010</li> <li>• Anggota Tim Biologi Studi AMDAL Pembangunan Dermaga Batubara Kertapati II PT. Bukit Asam (Persero) Tbk. Di Desa Perajin Kecamatan Banyuasin I Kabupaten Banyuasin Provinsi Sumatera Selatan, 2009.</li> <li>• Tim Biologi Penyusunan Dokumen UKL-UPL Pemboran Eksplorasi Darat Sumur Cerah-1 di Desa Danau Cala Kecamatan Lais Kabupaten Musi Banyuasin PT. Star Energy (Sekayu) Ltd. 2009.</li> <li>• Tim Biologi Penyusunan Dokumen UKL-UPL Pengembangan Lapangan Migas Area SAGO UBEP Lirik Kabupaten Indragiri Hulu Propinsi Riau PT. Pertamina EP UBEP Lirik. 2009</li> <li>• Tim Biologi Penyusunan Dokumen UKL-UPL Pengembangan Lapangan Migas UBEP JAMBI PT. Pertamina EP UBEP JAMBI. 2009</li> <li>• Tim Biologi Penyusunan Dokumen AMDAL Pembangunan Lapangan Golf PT. Bukit Asam (Persero) Tbk. Kab. Muara Enim, 2008.</li> <li>• Tim Biologi Pemantauan Lingkungan Kegiatan Seismik 2D di Blok Sekayu PT. Star Energy Ltd., 2008.</li> <li>• Tim Biologi Pemantauan Biota Akuatik , PT. Bukit Asam (Persero) Tbk. 2008-2010</li> <li>• Tim Biologi Penyusunan Dokumen AMDAL Pembangunan Perkebunan dan Pabrik Pengolahan Kelapa Sawit PT. Tani Musi Persada di Kec. Sanga Desa dan Kec. Babat Toman Kab. Musi Banyuasin, 2008.</li> </ul> |

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>• Tim Biologi Penyusunan Dokumen AMDAL Pembangunan Geothermal dan PLTP Sungai Penuh, Propinsi Jambi, PT. Pertamina Geothermal Energy 2008</li> <li>• Tim Biologi Penyusunan Dokumen UKL-UPL Pengembangan Perkebunan Kelapa Sawit PT. Golden Blossom Sumatra di Kecamatan Abab, Kabupaten Muara Enim, 2008</li> <li>• Tim Biologi Penyusunan Dokumen UKL-UPL Pengeboran Eksplorasi Darat PT. Odyra di Kec. Pulau Rimau, Kab. Banyuasin, 2008</li> <li>• Tim Biologi Penyusunan Dokumen UKL-UPL Seismik 3D Lapangan Tanjung Tiga Timur, KSO Pertamina EP-Formasi Sumatera Energi, 2008</li> <li>• Tim Biologi Penyusunan Dokumen AMDAL Pembangunan Geothermal dan PLTP Hululais, Kab. Lebong, Propinsi Bengkulu, PT. Pertamina Geothermal Energy 2008</li> <li>• Tim Biologi (Flora-Fauna) Penyusunan Dokumen <i>Baseline Study</i> pada Area Eksplorasi PT.Nusa Palapa Minerals, Musi Rawas, kerjasama dengan Environment Resource Management Consultant, 2008</li> <li>• Tim Biologi Penyusunan Dokumen <i>Baseline Study</i> PT. Pertamina (Persero) – KSO Sumatra Formasi Energi, Lapangan Tanjung Tiga Timur, 2007.</li> <li>• Tim Biologi Studi Penyusunan Dokumen Revisi UKL-UPL Depot Panjang, PT. Pertamina (Persero) di Pelabuhan Panjang, Lampung. 2007</li> <li>• Tim Biologi Studi Penyusunan Dokumen Revisi UKL-UPL Depot LPG Filling Plant PT. Pertamina (Persero) Pulau Layang, Palembang, 2007.</li> <li>• Tim Biologi Studi UKL-UPL Tower MSC PT. Bakrie Telecom, Tbk. Palembang, 2007</li> <li>• Anggota Tim Biologi Studi ANDAL Terminal Bus Tipe A Karya Jaya, Palembang, 1998</li> <li>• Anggota Tim Biologi Studi ANDAL Perkebunan kelapa sawit PT. Guthrie Pecconia, Musi Banyu Asin, 1998</li> <li>• Anggota Tim Biologi Studi ANDAL Perkebunan Kelapa Sawit PT. Rabin Mas Jaya, Belitung, 1997.</li> </ul> |
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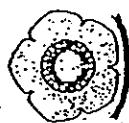
Palembang, 29 Maret 2011



Dr. rer. nat. Indra Yustian, M.Si.

Surat Nomor : 129/HK.2.1.3/PJU/2008

DEPARTEMEN PENDIDIKAN NASIONAL  
UNIVERSITAS SRIWIJAYA  
LEMBAGA PENELITIAN  
PUSAT PENELITIAN LINGKUNGAN HUTAN



Yogyakarta

Bapak Dr. H. Badli Perizade, M.B.A.

berhasil menyelesaikan

Pelatihan Penyusun AMDAL Periode 2008

di Tanggal 02 Juni 2008 s.d. 03 Juli 2008

di Yogyakarta, 03 Juli 2008

Rector



Dr. H. Badli Perizade, M.B.A.  
NIP. 130785359



# IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA

THE NATIONAL ASSOCIATION OF CONSULTING PROFESSIONALS INDONESIA

KEPUTUSAN MENTERI NEGARA LINGKUNGAN HIDUP P.NO. 245 TAHUN 2000

INTAKINDO

PERSETUJUAN SERTIFIKAT KOMPETENSI PENGETAHUAN DAN KEMAMPUAN DILAKUKAN PADA  
DOKUMEN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP

000446

## SERTIFIKAT KOMPETENSI

Nr. 000417/SKPA/LSK-INTAKINDO/III/2011

SERTIFIKAT DENGAN PERATURAN MENTERI NEGARA LINGKUNGAN HIDUP ACT. 37 TAHUN 2000  
TENTANG PERSYARATAN KOMPETENSI DALAM PENYUSUNAN INSTRUMEN ANALISIS  
MENGENAI DAMPAK LINGKUNGAN HIDUP DAN PERSYARATAN LEMBAGA PELATIHAN KOMPETENSI  
PELATIHAN DOKUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP  
IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA DENGAN INI MENYATAKAN BAWAH

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DILAKUKAN PADA SEMUA PERSYARATAN DAN KUTUTUAN SERTIFIKAT KOMPETENSI:  
PENYUSUN INSTRUMEN ANALISIS MENGENAI DAMPAK LINGKUNGAN HIDUP  
SEHARGA DENGAN DEMIKIAN BERIKAH MENDAPATKAN SERTIFIKAT KOMPETENSI SEBAGAI:

Ketua Tim Penyusun Dokumen Amdal

DITETAPKAN DI JAKARTA

TANGGAL

17 Maret 2011

DIWAN PENGURUS NASIONAL  
IKATAN NASIONAL TENAGA AHLI KONSULTAN INDONESIA

Ir. ERIE HERYADI

KETUA UMUM

SP



No. Registrasi **K.031.02.11.044.000404**

**Surat Pernyataan  
Sebagai Tim Penyusun Studi AMDAL**

Yang bertanda tangan di bawah ini:

Nama : Ir.Sarino  
Alamat : JL.Lunjuk Jaya Lr. Tulip NO 11 C  
RT 50 PALEMBANG

Menyatakan bahwa saya benar-benar ikut dalam penyusunan Dokumen AMDAL Rencana Pembangunan Saluran Irigasi yang berlokasi di Kec. Semendawai Timur Kab. OKU Timur, Kec. Lempuing dan Lempuing Jaya Kab. OKI.

Demikian Surat Pernyataan ini dibuat dengan sesungguhnya dan penuh dengan tanggung jawab

Palembang, Mei 2011  
Yang membuat pernyataan



Ir.Sarino

# DAFTAR RIWAYAT HIDUP

## PERSONAL

Nama : Ir. Sarino, MSCE.  
Tempat/Tgl. Lahir : Palembang, 9 Juni 1959  
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Organisasi Profesi : Anggota HATHI No. 112425  
Agama : Islam

## PENDIDIKAN

1. Thn 1986 Sarjana Fakultas Teknik Jurusan Teknik Sipil Universitas Sriwijaya.
2. Thn 1990 Master of Science in Civil Engineering University of Kentucky, Lexington USA.

## PELATIHAN

- 1.. Thn 2000 Concrete Structure and Laboratory works at UNSYIAH Aceh
- 2.. Thn 2001 IT Project Management , Jakarta
3. Thn 2004 Training in Soil Testing at Gifu University, Japan.
4. Thn 2005 Training in Steel Structure Testing at UTM, Malaysia

## PENGALAMAN KERJA

1. Thn 1983-1986: Sebagai Staf Teknik Biro Insinyur CV. Peringga Jaya menangani:
  - a. Thn 1984 Sebagai Asisten Perencana pada Perencanaan Teknis Satuan Pemukiman Transmigrasi Peninjauan XII/b, OKU.
  - b. Thn 1985 Sebagai Asisten Perencana pada Perencanaan Irigasi Air Malus, Musi Rawas.
  - c. Thn 1985 Sebagai Wakil Kepala Supervisi Pembukaan Lahan dan Jalan Pemukiman Transmigrasi Benakat IV/a, Kab. Musi Rawas.
  - d. Thn 1986 Sebagai Kepala Supervisi Pembukaan Lahan dan Jalan Pemukiman Transmigrasi Bingin teluk III/e, Kab. Mura.
2. Thn 1991-1992: Sebagai Hydrologist Perencanaan Tata Ruang Wilayah Propinsi Sumatera Selatan

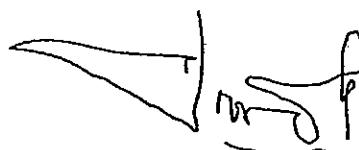
3. Thn 1991 : Sebagai Hydrologist Perencanaan Tata Ruang Kabupaten Muara Enim dan Kabupaten Lahat.
4. Thn 1992 : Sebagai Hydrologist Perencanaan Tata Ruang Kabupaten Musi Banyuasin dan Kabupaten OKI.
5. Thn 1991 : Biro Insinyur CV. Teknika, sebagai Drainage Engineer pada Penataan Bangunan Sepanjang Tepi Sungai Musi
6. Thn 1990-1992 : **Sebagai Wakil Project Manager Management Konstruksi (PT. Kharisma Mezzanine) pada Pembangunan Kampus Baru Unsri, Indralaya.**
7. Thn 1993 : Koordinator Prasarana Perencanaan Tata Ruang IKK Kecamatan Tanjung Batu dan Kecamatan OKI Sumatera Selatan.
8. Thn 1993 : Sebagai Sanitary and Drainage Engineer Palembang Urban Development Project pada PT. MC. Donalt International and Associate.
9. Thn 1993 : Sebagai Wakil Koordinator Pekerjaan Engineering Survai Telang and Air Saleh Agricultural Development Project, Drainage Development Component.
10. Thn 1994 : Sebagai Hydrologist Perencanaan Renovasi Jembatan Muara Enim I
11. Thn 1994 : Sebagai Hydrologist untuk Perencanaan Induk Pengendalian Banjir Sungai Musi pada CV. Wira Perdana Consultant.
12. Thn 1994 : Sebagai Koordinator Pengukuran dan Prasarana Perencanaan Real Estate Terpadu PT. Anaya Corporation Indralaya.
13. Thn 1995 : **Sebagai Wakil Koordinator Pekerjaan Penyelidikan Tanah pada HINDOLI Palm Oil Refinery di Sungai Lilin, Musi Banyuasin.**
14. Thn 1995 : Sebagai Koordinator Prasarana Perencanaan Tata Ruang Detail Kota Tugu Mulyo.
15. Thn 1996 : Sebagai Analis Prasarana Penyusunan Rencana Induk Tempat Pelelangan Ikan.
16. Thn 1996 : Sebagai Drainage Engineer Perencanaan Pengendalian Banjir Lokasi Transmigrasi Mataram Jaya, Kab.OKI.
17. Thn 1997 : Sebagai Ahli hidrologi dalam Redesain RTSP Kenawang Pulau Gading, Kab.Muba.
18. Thn 1997 : Sebagai Ahli hidrologi dalam Evaluasi RTRWP Sumatera Selatan.
19. Thn 1998 : **Sebagai Procurement Consultant pada Proyek Perluasan dan Peningkatan Mutu SLTP Sumatera Selatan (Dana Bank Dunia IND 4095).**
20. Thn 1998 : Sebagai Ketua Tim Penataan Kawasan Kumuh Kodya Palembang pada Proyek P3P untuk PT. Cipta Griya Persada.
21. Thn 1998 : Sebagai Ketua Tim Identifikasi Kawasan Genangan di 6 kota Di Sumatera Selatan.
22. Thn 1998 : Sebagai hidrologist pada Pemetaan Kawasan Genangan di Ogan Komering Ilir untuk PT. Damanset.

23. Thn 1998 : Sebagai Ketua Tim Identifikasi Air Baku di Tiga Kota di Sumatera Selatan untuk PT.Profil Studio ARCH.
24. Thn 1998 : Sebagai Hidrologist pada Revisi RTRW Kabupaten OKI untuk Pusat Penelitian Tata Ruang UNSRI
25. Thn 1999 : **Sebagai Procurement Consultant pada Proyek Perluasan dan Peningkatan Mutu SLTP Sumatera Selatan (Dana Bank Dunia IND-4095).**
26. Thn 1999 : Penyusunan DED dan Supervisi Program Penanganan Kawasan Kumuh Lokasi Kel. 19, 22 dan 28 Ilir Kotamadya Palembang sebagai Team Leader CV.Cipta Griya Persada.
27. Thn 2000 : Studi Penataan Kawasan Binaan 35 – 36 Ilir Dengan Kedalaman Rencana Teknis dan DED Sarana Prasarana sebagai Ahli Financing Plan.
28. Thn 2000 : Sebagai Team Leader Perencanaan Pengembangan Jaringan Kanal (Inland Waterway) sebagai Prasarana Transportasi Alternatif Untuk Wilayah Lahan Basah di Pesisir Timur Sumatera Selatan.
29. Thn 2000 : **Sebagai Procurement Consultant pada Proyek Perluasan dan Peningkatan Mutu SLTP Sumatera Selatan (Dana Bank Dunia IND-4095).**
30. Thn 2001 : **Sebagai tim Struktur Renovasi Mesjid Agung Palembang.**
31. Thn 2001 : Anggota tim Fasilitasi pengelolaan Kolam Retensi oleh Masyarakat di kota Palembang
32. Thn 2003 : Sebagai hidrologist pada pekerjaan Revitalisasi Jaringan Irigasi DI Permis Bangka.
33. Thn 2003 : **Sekretaris Panitia Lelang Laboratory Equipment Bidding Committee in Technological Professional Supporting Development Project for 4 Universities (UNSRI, ITENAS Bandung, UBL Lampung ) dana ADB loan.**
34. Thn 2004 : Sebagai Ahli Hidrologist pada pekerjaan Study Sub DAS Kelekar di Prabumulih. Dinas PU Kota Perabumulih
35. Thn 2004 : **Sebagai Ahli Struktur Perencanaan Sekolah Unggulan Terpadu PTBA Tanjung Enim**
36. Thn 2005 : Studi awal Reklamasi Rawa untuk Perkebunan Tebu GPM di Manggala , Lampung Tengah ( April – Juni )
37. Thn 2005 : Sebagai tenaga ahli infrastruktur penyusunan RPJM Kab. OKI
38. Thn 2006 : **Chairperson kegiatan Bidding Evaluation Committee of Renovation of Puskesmas di Sumatera Selatan SCHS Project, Departemen Kesehatan dan Uni Eropa**
39. Thn 2006 : **Koordinator Fasilitator Manjemen Konstruksi Rehabilitasi Gedung Sekolah Dasar dengan Partisipasi Masyarakat di Sumatera Selatan , Departemen Pendidikan Nasional.**

40. Thn 2007 : Tim Teknis Kegiatan Rehabilitasi Gedung Sekolah Dasar dengan Partisipasi Masyarakat di Sumatera Selatan , Departemen Pendidikan Nasional.
41. Thn 2007 : Member kegiatan Bidding Evaluation Committee of Renovation of Puskesmas di Sumatera Selatan SCHS Project, Departemen Kesehatan dan Uni Eropa
42. Thn 2010 : Team Leader Construction Management Program Block Grant Pembangunan USB SMP, Pengembangan SD-SMP SATAP, dan Revitalisasi RSBI melalui partisipasi masyarakat untuk Cluster III ( Sumsel, Lampung, Jambi, Bengkulu, dan Babel ). Kemendiknas, Direktorat jenderal Pendidikan Dasar.

Demikianlah Curriculum Vitae ini dibuat dengan sebenarnya dan dapat dipergunakan seperlunya.

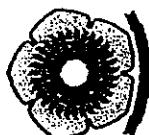
Palembang, 13 Maret 2011



**Ir. Sarino, MSCE.**

DEPARTEMEN PENDIDIKAN NASIONAL  
UNIVERSITAS SRIWIJAYA  
LEMBAGA PENELITIAN

PUTAT PENELITIAN LINGKUNGAN HIDUP



Menyatakan bahwa :

H. H. Sarino, MSCE.

telah berhasil menyelesaikan

Pelatihan Penyusun AMDAL Periode I Tahun 2009

dari tanggal : 02 Februari 2009 s.d 06 Maret 2009

Palembang, 06 Maret 2009



Rektor

Prof. Dr. Dedi Perizade, MBA.  
NIP. 1307855359



KEMENTERIAN PEKERJAAN UMUM  
DIREKTORAT JENDRAL SUMBER DAYA AIR  
BALAI BESAR WILAYAH SUNGAI SUMATERA VIII  
Jl. Kapten Anwar Sastro No. 1251 Telp/Fax (0711) 312272-PALEMBANG

**FINAL REPORT ON ENVIRONMENTAL IMPACT  
ASSESSMENT FOR IRRIGATION DEVELOPMENT AT  
LEMPUING AREA (13,500 ha)**

**2. ENVIRONMENTAL MANAGEMENT PLAN  
(RKL)**

IN  
SEMENDAWAI TIMUR SUBDISTRICT  
OGAN KOMERING ULU TIMUR DISTRICT  
AND  
LEMPUING DAN LEMPUNG JAYA SUBDISTRICTS  
OGAN KOMERING ILIR DISTRICT  
SOUTH SUMATRA PROVINCE



PT. ALLES KLAR PRIMA  
PALEMBANG, OCTOBER 2011

# **LETTER OF STATEMENT**

We the undersign below :

Name : Ir. Soekotjo Tri Sulistyo, Dipl. HE  
Position : The Activity Guarantor of secondary and sub-secondary channels development at Lempuing irrigation area  
Address : Jl. Kapten Anwar Sastro No. 1251 Palembang

act for and on the behalf of initiator is responsible for initiator activity including environmental management of secondary and sub-secondary channels development activity at Lempuing irrigation area as stated in Documents of Environmental Impact Analysis (ANDAL), Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL).

Name : Satker Balai Besar Wilayah Sungai VIII  
Address : Jl. Kapten Anwar Sastro No. 1251 Palembang  
Activity type : Secondary and Sub-Secondary Channel Development at Lempuing Irrigation Area in Semendawai Timur of OKU Timur District as well as Lempuing and Lempuing Jaya of OKI District.

Declare that :

1. We promise to conduct environmental management and environmental monitoring as a consequence of our activity according to the current stated regulation as mentioned in Environmental Impact Analysis Document (ANDAL), Environmental Management Plan Document (RKL) and Environmental Monitoring Plan Document (RPL) of secondary and sub-secondary channels development activity at Lempuing irrigation area.
2. We are willing to take responsibility and subject to sanction according to the current stated regulation if we neglect/not conducting RKL/RPL as should have been.



**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**  
**ENVIRONMENTAL MANAGEMENT PLAN**  
Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

# FOREWORD

Satker Balai Besar Wilayah Sungai VIII has plan to conduct activity of secondary and sub-secondary channels development at Lempuing irrigation area which cover Semendawai Timur Subdistrict in OKU Timur District as well as Lempuing and Lempuing Jaya Subdistricts in OKI District.

Results of Environmental Impact Analysis study toward the activity showed that it will produce some impacts on environment, either important positive impact or important negative impact on environmental components. Important negative impact from activity should be minimized or omitted if possible, whereas important positive impact should be developed. These documents of Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL) are composed to describe the efforts to monitor, prevent, control and solve the significant negative and important negative impacts on environment and improving positive impacts as a result of this activity.

We send our grateful to all parties that had helped in composing these documents since the secondary data collecting up to field study. Our thank and respect are also conveyed to all parties that had already gave direction so that these documents can reach the directed and agreed upon target.



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# **CHAPTER I**

## **INTRODUCTION**

### **1.1. Background**

Continuous utilization of natural resources in Indonesia has been made to improve the community welfare in all areas of Republic of Indonesia and natural resources utilization is recently increasing due to the increase in population. Meanwhile, increase in population creates the new challenge, i.e. limitation of land area available for settlement and agricultural purposes.

The current development and utilization of either swamp land or non-swamp land is one of the effort made by government to increase agricultural production. It is expected that food crop production, especially rice, can be increased through agricultural area extension to fulfill the demand of food which is recently increased due to relatively rapid increase in population.

The government also implemented the agricultural intensification program to increase the crop production in addition to the area extension program. This agricultural intensification program is closely related to Panca Usaha Tani program in which the irrigation is prerequisite to get the maximum agricultural production. Under these circumstances and to achieve the target, the government through Directorate General of Water Resources Development, Department of Public Works, has issued a letter No.180/KPTS/A/1990 to establish a committee for the implementation of Komering Irrigation Project with irrigation area of 120,000ha.

Komering Irrigation Project has been commenced in 1990 with the rehabilitation and improvement of Belitang Irrigation Area of about 21,000 ha as the Stage I development including the construction of Perjaya Headworks, Komering Main Canal and Ranau Regulating Facility. This Stage I was completed by 1997 and the Stage II development including North Komering Irrigation Area (16,640 ha), South Komering Irrigation Area (10,519 ha) as well as Bahuga Irrigation area and Muncak Kabau Irrigation Area (6,021 ha) has been commenced consecutively.

Development of Lempuing irrigation system (hereinafter referred as the project) of 13,500 ha is one of the development activities under Komering Irrigation Project. The purpose of the project is to improve the function of the land from a rain-fed paddy field to a technical irrigated paddy field through the development of irrigation and drainage canals using the additional water resource from Ranau Lake. The project is expected to improve the economic conditions and well-being of the surrounding communities through an increase of agricultural production, especially of rice.

Increase of food production using extensification technique through paddy field development has been conducted since some years ago. Paddy field development activity followed by irrigation channel development had change landscape condition and can results in basic change to environmental components. Therefore, analysis toward the probable impacts should be conducted during the on-going activity. Analysis is done to determine environmental condition after and before the activity implementation so that efforts can be provide to minimize the probable negative impact from this activity.

Based on study results of Environmental Impact Analysis toward activity plan of secondary and sub-secondary channels development at Lempuing area which consisted of pre-construction, construction, operational and post operational stages, it is known that this activity will produce impacts to environmental components either important positive impact or important negative impact. The important negative impact should be minimized, whereas important positive impact should be developed. Environmental management program should be composed in order to anticipate the probable important negative impact. This Environmental Management Plan (RKL) is composed according to the stated current regulation.

Environmental Management Plan (RKL) is efforts to prevent, control and solve the significant and important negative impacts as well as to improve probable positive impacts toward environment as a results of secondary and sub-secondary channels development activity at Lempuing area. Environmental Management Plan (RKL) should be conducted for the interest of initiator, community members and more extensive interest in order to support the development.

## **1.2. Objective and Benefit**

### **1.2.1. Activity Objective**

Activity objectives of Lempuing Irrigation Channel Development are as follows :

- 1) Utilization improvement of water resource available in Komering River for agricultural activity.
- 2) Fulfilling irrigation water requirement for agricultural cultivation improvement at paddy field land of Lempuing area.
- 3) Increasing the agricultural production especially paddy field rice through increase of planting index (IP).
- 4) Increasing the community income and triggering economy growth of local area.

### **1.2.2. Activity Benefits**

Activity of Lempuing irrigation network development will have benefits either for government or community. Some of these benefits are described as follows :

#### **1.2.2.1. For Government**

- 1) Increasing the natural resources utilization especially water and land resources.
- 2) Increasing the food supply that can support the tenacity of food self-sufficiency.
- 3) Increasing the agricultural sector growth that capable to support general agricultural development.
- 4) Increasing the economic growth and area development.

#### **1.2.2.2. For Community**

- 1) Increasing the manpower recruitment at agricultural sector that can decrease the unemployment level.
- 2) Increasing the agricultural production especially food crops that capable to increase the community income.
- 3) Increasing the business opportunity at agricultural sector and other related sectors.
- 4) Increasing the economic activity and community welfare.

## **1.3. Environmental Policy**

Environmental management is integrated effort to conserve environmental function that consisted of several policies such as ordering policy, utilization, development, maintenance, restoration, supervision and controlling of environment. These

policies follow the principles of responsibility, sustainability and benefit with an objective to realize environment-friendly sustainable development.

Environmental management should be managed so that its biodiversity potential conservation and ecosystem is guaranteed, its economic potential can be utilized in sustainable manner for the highest benefit of community which are directly interact with management area as well as utilization activity or development in order to prevent damage, environmental pollution and decrease of local culture value.

#### **1.4. Environmental Management Purpose**

Environmental management is beneficial for government or community. In general, environmental management is beneficial to maintain ecosystem balance at the surrounding activity location through the management of important positive impacts or important negative impacts by minimizing or preventing the negative impact and increasing the positive impact that give higher benefit toward the initiator or other party, especially the community that enjoy positive impact.

##### **1.4.1. Initiator Interest**

The environmental management purpose for the initiator can be described as follows :

- 1) To maintain that implementation of secondary and subsecondary channels development should be parallel to standard and proposed time schedule.
- 2) To keep and to maintain that all environmental elements are in equilibrium, environmental supporting power in the surrounding of activity location is everlasting and harmonic relationship amongst community members affected by activity impacts.

##### **1.4.2. Interest of Related Institutions or Other Parties**

It is hoped that availability of environmental management implementation can guarantee the social interaction amongst development agent with local and regional communities as well as the development of safe and controllable condition that decrease the occurrence probability of community unrest and social conflict.

**1.4.3. Extended Interest in Supporting the Development.**

Environmental management activity for secondary and subsecondary channels development at Lempuing irrigation area will produce more extensive positive impact in supporting the development that can be described as follows :

- 1) As information source to construct similar environmental management program in higher scale of development.
- 2) To determine exactly the responsibility and the obligatory of environmental management program.

## **CHAPTER II ENVIRONMENTAL MANAGEMENT APPROACH**

Activity plan of secondary and sub-secondary channels development will produce some impacts either positive or negative. Therefore, environmental management approach is needed in order to implement this activity in optimum manner by considering environmental aspects.

### **2.1. Technological Approach**

Technological approach is the one that utilize the current science and technology advances that can produce some technological alternatives which are suitable with the required specification in management of important impacts. Some technological approaches that can be used to reduce or minimize the produced impacts are as follows :

- a. The use of vehicles and equipments in good condition according to the standard and soil surface ordering at the surrounding of activity/project location to minimize erosion or suspended soil particles.
- b. Road maintenance and repair especially at zones close to the project activity location.
- c. Continuous road spraying on dusty locations, especially at dry season to minimize air dust at surrounding of activity location.
- d. Using garbages screen in irrigation channel that can hold the garbages so that they can be selected and recycled.

### **2.2. Socioeconomic and Cultural Approach**

Socioeconomic and cultural approach in environmental impact management is conducted by fully considering socioeconomic condition of local community and not contradict to the existing culture so that it can reduce the negative impact and optimize the positive impact. The steps which are conducted in this approach can be described as follows :

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ENVIRONMENTAL MANAGEMENT PLAN

Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

- a. Managing the implementation of land exemption activity by involving community members, community key persons and local government officers.
- b. Initial socialization to community is conducted before the activity initiation by giving open information so that they can anticipate all probabilities, including positive opportunity utilization through development of job opportunity and business opportunity.
- c. Optimizing the use of local manpower and local contractor according to the required skill and expertise specification.
- d. Managing the activity implementation by involving some of local community members.
- e. Put into effect the strict regulation of speed and tonnage on materials transportation carrier to minimize road damage and traffic jam.
- f. Providing and require all workers to use safety equipments such as *safety belt, ear plug, hand glove, helm, masker, eyeglasses and car plug*.
- g. Implementation of construction manpower severance is based on current stated regulation and ordinance.
- h. Conducting the approach and socialization toward manpower and community key persons before implementation of construction manpower severance.
- i. Conducting the extension service toward community for not throwing garbages into irrigation channels either by using warning notice board or direct approach.
- j. Installing the warning notice board with the statement that irrigation channel is not the location for bathing, washing and latrine (MCK) activities.
- k. Providing garbage box at dense community area in the surrounding of channel location.

### **2.3. Institutional Approach**

Institutional approach is one of impact management effort by utilizing collaboration probability through institutional approach amongst some institutions at activity area either government institution or non government (Non Government Organization/NGO, religion key persons and other stakeholders). Steps that can be conducted on impact management through this approach are as follows :

- a. Coordination with Manpower Council (manpower resources preparation), Environmental Council (for the study of environmental document and several

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effort/plan for the proposed management and monitoring in environment), National Land Council (related to land exemption process), Forestry and Plantation Council as well as Local Development Planning Council (Appropriateness with Area Space Order Plan) and other related institutions such as Health Council, Agricultural Council and Transportation Council.

- b. Coordination with Local Government starting from Village, Subdistrict, District and Province levels related to the solution process of probable social problems.

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ENVIRONMENTAL MANAGEMENT PLAN

Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

# **CHAPTER III**

# **ENVIRONMENTAL MANAGEMENT PLAN**

Environmental management activity is conducted to prevent, control and solve the negative significant and negative important impacts on environment and to improve positive impact due to development activity of Lempuing irrigation channel. These management efforts can be described as follows.

## **3.1. Pre Construction Stage**

All activities at this stage will have impact only on community perception as described below.

### **a. Impact Source**

The main impact source is all activities at pre-construction stage. Negative perception from community members will appear before activity implementation if they feel suffer financial loss or not receiving land compensation price and health disorder due to the decrease of environmental quality in their surrounding area.

### **b. Impact Criteria**

1. Project activity appropriateness with current stated regulation.
2. Unrest and social conflict occurrence within community at the surrounding of activity/project location.

### **c. Management Objective**

1. Preventing the unrest and social conflict.
2. Improving the family atmosphere relationship between initiator and local community.
3. Improving the positive impact due to activity implementation.

### **d. Management Effort**

1. Conducting distribution of open information related to activity plan either directly or indirectly through mass media.
2. Managing activity implementation by involving several local community members.
3. Providing friendship forum to develop close relationship between initiator and local community members.

4. Collaboration with subdistrict and village officers at surrounding of activity location to deliver activity socialization toward community members.
5. Collaboration with Land Council and Satpol PP of OKU Timur and OKI Districts.  
Collaboration with subdistrict and village officers at surrounding of activity location to socialize the activity toward community in open manner.

**e. Management Location**

At the surrounding location of channel development activity.

**f. Management Period**

At activity of pre-construction stage.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Operator of management activity is the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**i. Management Supervisor**

Environmental Council, Agricultural Council and Land Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Agricultural Council and Land Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.2. Construction**

**3.2.1. Air Quality**

**a. Impact Source**

The main impact source at this stage is equipments and materials mobilization activity and channel development activity resulting in decrease of air quality either from pollutant of exhaust gas emission of heavy equipments or dust during materials transportation. Exhaust gas emmision into atmosphere is relatively high at this activity based on similar activity measurement.

**b. Impact Criteria**

Regulation of South Sumatra Province No.17/2005 related to quality standard of ambient air and noise level.

**c. Management Objective**

Reducing the negative impacts from mobilization activity of equipments and materials as well as channel development on the decrease of air quality at surrounding area.

**d. Management Effort**

1. The use of vehicles and equipments in good condition according to the standard.
2. Maintenance for carrier vehicles and heavy equipments so that the produced emission is within the quality standard of moving source emission.
3. Continous road spraying on dusty location especially at dry season.
4. Road maintenance and repair especially in zone close to project activity location.
5. Increasing dust particles and odor can be reduced by watering and covering up the excavation materials with canvas.
6. Materials transportation is done in night time when the road users are minimum.
7. Put into effect the strict regulation of speed and tonnage for vehicles and equipments.
8. Provision and require the workers to use safety equipment such as masker and eyeglasses.
9. Giving instruction to workers about the importance of maintaining air quality decrease as minimum as possible.
10. Conducting the stepwise activity according to the plan and progress of activity/project implementation.
11. Giving instruction to workers about the importance of maintaining air quality decrease as minimum as possible.
12. Collaboration with Transportation Council in implementation of equipments mobilization and channel development to minimize impact on the decrease of air quality.
13. Collaboration wth Health Council in health management and supervision of air quality level.

**e. Management Location**

At activity/project site of on-going channel development.

**f. Management Period**

During activity stage of on-going channel development.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Operator of management activity is the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**i. Management Supervision**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

### **3.2.2. Noise Level and Vibration**

**a. Impact Source**

The main impact sources at this stage are equipments and materials mobilization and channel development activities. Heavy traffic load of project vehicles can increase the noise level. Relatively high noise level is especially due to vehicles and heavy equipments used at the settlement area.

**b. Impact Criteria**

Regulation of South Sumatra Governor No. 17/2005 related to quality standard of ambient air and noise level.

**c. Management Objective**

Reducing the negative impact of equipments and materials mobilization as well as channel development activities on the increase of noise level and vibration.

**d. Management Effort**

The reduction of negative impact toward noise level and vibration can be done through management efforts as follows :

1. The use of vehicles and equipments in good condition according to the standard.
2. Maintenance for carrier vehicles and heavy equipments.
3. Materials transportation is done in night time when the road users are minimum.
4. Put into effect the strict regulation of speed and tonnage for vehicles and equipments.

5. Provision and requires the workers to use safety equipment of *ear plug*.
6. Giving instruction to workers about the importance of maintaining the increase of noise level and vibration as minimum as possible.
7. Collaboration with Transportation Council in implementation of equipments mobilization and channel development to minimize impact on the increase of noise level and vibration.
8. Conducting medical checkup (especially ear, nose and throat (THT)) for field workers.
9. Collaboration wth Health Council in health management and supervision of noise level and vibration.

**e. Management Location**

At the site of on-going activity/project.

**f. Management Period**

During on-going activity stage.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Operator of management activity is the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**i. Management Supervisor**

Environmental Council, Tranportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Tranportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

### **3.2.3. Water Quality and Hydrology**

**a. Impact Source**

The main impact source is channel development activity. This activity will have impact on water quality and hydrology due to turbidity increase as a results of suspended organic matter from mud and organic wastes during embankment excavation and development.

**b. Impact Criteria**

Impact criteria is the change of water quality parameters compared to the stated current quality standard (Regulation of South Sumatra Governor No.16/2005 and Health Minister Decree of Indonesia Republic No.907/Menkes/2002, i.e. increase of Total Soluble Solid and Turbidity in Water).

**c. Management Objective**

Reducing the negative impacts of channel development activity on the decrease of water quality and sedimentation as well as water body shallowing at the surrounding of activity location.

**d. Management Effort**

1. Conducting strict area bordering to prevent unnecessary land clearing, i.e. land clearing is only done according to proposed plan.
2. Conducting stepwise activity in accordance to plan and progress of activity/project implementation.
3. Developing and ordering of water channels within and at the surrounding of activity/project location to minimize landslide and erosion which dissolve the soil particles.
4. Collaboration with Health Council of South Sumatra Province in management and supervision of water quality.

**e. Management Location**

At the site of on-going activity/project.

**f. Management Period**

During on-going activity stage.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council, Fishery and Oceanic Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Fishery and Oceanic Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.2.4. Space, Land and Soil**

**a. Impact Source**

The main impact source is channel development activity.

**b. Impact Criteria**

Soil physical and chemical characteristics according to Soil Research Center (PPT, 1981).

**c. Management Objective**

Maintaining or maximizing activity benefit value so that space, land and soil are in good and beautiful condition.

**d. Management Effort**

1. Conducting the development according to the stated plan in good and proper manner.
2. Conducting replanting activity on opened land/soil after channel development in order to reduce land and soil deterioration especially on sloping channel embankment as well as minimizing erosion by using grasses or legume cover crops.
3. Conducting routine soil analysis in order to know soil condition.

**e. Management Location**

At the site of on-going activity/project.

**f. Period of management**

During on-going activity stage.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor and Environmental Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.2.5. Inland Flora and Fauna**

**a. Impact Source**

The main impact source is channel development activity.

**b. Impact Criteria**

The existence of natural vegetation in good condition at the surrounding of activity location.

**c. Management Objective**

Providing shelter and food resource for wildlives as well as minimizing the extinction of wildlives and natural vegetations.

**d. Management Effort**

1. Constructing banning or warning notices board as well as appeal for not doing wildlives hunting.
2. Conducting strict area bordering to prevent unnecessary land clearing, i.e. land clearing is only conducted according to the proposed plan.
3. The existence of security officers or supervisors at irrigation channel and conservation area.
4. Producing, installing and maintaining the signs and/or notice and warning boards related to conservation of protected area/green belt area.
5. Maintaining and enriching the vegetation types available at green belt area with local origin types that have multiple function.
6. Extension service and socialization toward community.

**e. Management Location**

At the site of on-going activity/project.

**f. Management Period**

During construction stage.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council as well as Forestry and Plantation Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council as well as Forestry and Plantation Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts.

**3.2.6. Waters Biota**

**a. Impact Source**

The main impact source is channel development activity. Increase of turbidity due to suspended soil particles into waters body results in change of water quality that has impact on waters biota equilibrium.

**b. Impact Criteria**

Changes in type composition, abundance, diversity index as well as homogeneity index of plankton, benthos, and neoton compared to initial condition.

**c. Management Objective**

Channel development activity should have minimum negative impact on waters biota at the surrounding of activity/project location.

**d. Management Effort**

1. Using vehicles and equipments in good condition according to the standard.
2. Conducting strict area bordering to prevent unnecessary land clearing, i.e. land clearing is only conducted according to the proposed plan.
3. Conducting stepwise activity in accordance to plan and progress of activity/project implementation.
4. Developing and ordering of water channels within and at the surrounding of activity/project location to minimize the suspended soil particles.

5. Conducting stepwise activity in accordance to plan and progress of activity/project implementation.
6. Conducting the appeal toward community members for not throwing garbages into river.
7. Collaboration wth Health Council in health management and supervision of water quality.

**e. Management Location**

At on-going activity/project site.

**f. Periode pengelolaan**

During on-going construction activity stage.

**g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.2.7. Job Opportunity, Business Opportunity and Local Economy**

**a. Impact Source**

The main impact source is manpower recruitment activity. The existence of job opportunity and business opportunity will produce sufficient contribution toward solution of unemployment problem which will increase the capability of community to fulfill the life neccessity.

**b. Impact Criteria**

1. Appropriateness of manpower recruitment process with the stated current regulation.
2. Recruited numbers of local manpower.
3. Community income level.

**c. Management Objective**

1. Manpower recruitment should be in accordance to regulation.
2. Giving priority to local manpower in project activity.
3. Activity should give positive contribution toward local community welfare.

**c. Management Effort**

1. Conducting objective manpower recruitment in order to prevent collusion and nepotisms.
2. Giving priority to local community members as manpower force.
3. Conducting open distribution of information related to manpower recruitment plan either directly or through mass media.
4. Involving the formal key persons (Head of Village or Head of District) on manpower recruitment process.
5. Collaboration with Manpower Council in manpower recruitment process in order to get certain qualification and numbers of manpower according to the requirement.

**d. Management Location**

At on-going activity/project site.

**e. Management Period**

During on-going construction activity stage.

**f. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

**g. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**h. Management Supervisor**

Environmental Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**i. Pelaporan**

Governor, Environmental Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

### **3.2.8. Community Health**

#### **a. Impact Source**

The main impact source is channel development activity. Decrease of air quality and increase of noise level as well as dust at the surrounding of activity location and road lane will have negative impact on community health.

#### **b. Impact Criteria**

Community health level at the surrounding of activity/project location.

#### **c. Management Objective**

Minimizing negative impact toward community health at the surrounding of activity/project location.

#### **d. Management Effort**

1. Using vehicles and equipments in good condition according to the standard.
2. Continous road spraying on dusty location especially at dry season as well as covering up excavation materials by using canvas.
3. Materials transportation is done in night time when the road users are minimum.
4. Materials transportation is done by considering allowable tonnage limit to minimize dust due to road damage.
5. Conducting strict area bordering to prevent unnecessary land clearing, i.e. land clearing is only conducted according to the proposed plan.
6. Collaboration wth Health Council in management and supervision of community health.

#### **e. Management Location**

At the surrounding of activity location and along the road lane of on going channel development activity.

#### **f. Periode pengelolaan**

During chanel development activity stage.

#### **g. Funding**

Management activity is funded by the initiator (Balai Besar Wilayah Sungai Sumatera VII).

#### **h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.2.9. Community Perception**

**a. Impact Source**

The main impact source is all activities at construction stage. Negative perception of community will occur if they feel suffer financial loss or not receiving proper land compensation price as well as community health disorder due to decrease of environmental quality at the surrounding of their settlement.

**b. Impact Criteria**

1. Appropriateness of project activity with the stated current regulation.
2. Unrest and social conflict occurrence in the community at the surrounding of activity/project location.

**c. Management Objective**

1. Preventing the occurrence of unrest and social conflict.
2. Increasing the family atmosphere relationship between initiator and local community.
3. Increasing positive impact due to the activity.

**d. Management Effort**

1. Conducting open distribution of information related to activity plan either directly or through mass media.
2. Managing activity implementation by involving local community members.
3. Collaboration with Subdistrict and Village Officers, Land Council and Satpol PP at the surrounding of activity location in activity socialization toward community in open manner.

**e. Management Location**

At the surrounding of activity location and along the road lane.

**f. Management Period**

At construction stage.

**g. Funding**

Balai Besar Wilayah Sungai Sumatera VII.

**h. Management Operator**

Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council, Land Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Pelaporan**

Governor, Environmental Council, Land Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.3. Operational Stage**

**3.3.1. Water Quality and Waters Biota**

**a. Impact Source**

The main impact source is activities of channel maintenance and irrigation facility operation. The use of fertilizers and pesticides during channel operation can decrease water quality and waters biota in the surrounding of activity location.

**b. Impact Criteria**

Impact criteria are the change in water quality parameters (Regulation of South Sumatra Governor No.16/2005) and the changes in type composition, abundance, diversity index and homogeneity index of plankton, benthos and necton compared to the initial condition.

**c. Management Objective**

Minimizing negative impact on the decrease of water quality and waters biota due to operation of channels and their facilities.

**d. Management Effort**

Conducting extension service toward community with the help of related institutions as well as involving P3A in term of fertilizer dose and proper use of pesticides according to crops requirement and production as well as clean agricultural production that will have no negative impact on environment.

**e. Management Location**

At water body in the surrounding of activity location.

**f. Management Period**

At operational activity stage.

**g. Funding**

Balai Besar Wilayah Sungai Sumatera VII

**h. Management Operator**

Balai Besar Wilayah Sungai Sumatera VII

**i. Management Supervisor**

Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Pelaporan**

Governor, Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.3.2. Job Opportunity, Business Opportunity and Local Economy**

**a. Impact Source**

The main impact source is activity of irrigation facility operation. Irrigation channel operation will increase water supply for rice crops that can increase job opportunity and business opportunity which in turn increase local economy due to increase of agricultural production.

**b. Impact Criteria**

1. Unemployment level.
2. Farmer income/welfare level.

**c. Management Objective**

This activity will give optimum positive contribution toward community welfare at the surrounding of activity location.

**d. Management Effort**

1. Conducting socialization toward community related to irrigation channel operation.
2. Collaboration with related institutions in extension service in term of optimum utilization of irrigation water.

3. Collaboration with related institutions in extension service in term of sustainable agricultural production.
4. Facilitate the growth of agricultural institution so that irrigation water benefit can be used in optimum and evenly manners.

**e. Management Location**

At the surrounding of activity location.

**f. Management Period**

At operational activity stage.

**g. Funding**

Balai Besar Wilayah Sungai Sumatera VII

**h. Management Operator**

Balai Besar Wilayah Sungai Sumatera VII

**i. Management Supervisor**

Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.3.3. Community Health and Perception**

**a. Impact Source**

The main impact source is operational activity of channel and irrigation facilities.

**b. Impact Criteria**

1. Community health level in the surrounding of activity/project location.
2. Appropriateness of project activity with the stated current regulation.
3. Unrest and social conflict occurrence in community settlement at the surrounding of activity/project location.

**c. Management Objective**

1. Minimizing negative impact of activity on community health in the surrounding of activity/project location.
2. Preventing the occurrence of unrest and social conflict.
3. Increasing the produced positive impact from activity.

**d. Management Effort**

1. Collaboration with related institutions in extension service in term of optimum utilization of irrigation water.
2. Collaboration with related institutions in extension service in term of sustainable agricultural production.
3. Facilitate the growth of agricultural institution so that irrigation water benefit can be used in optimum and evenly manners.

**e. Management Location**

At the surrounding of activity location.

**f. Management Period**

At operational activity stage.

**g. Funding**

Balai Besar Wilayah Sungai Sumatera VII

**h. Management Operator**

Balai Besar Wilayah Sungai Sumatera VII

**i. Management Supervisor**

Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.4. Post Operational Stage**

**3.4.1. Air Quality**

**a. Impact Source**

The main impact source in this activity is ordering of channel and irrigation facility that cause decrease in air quality either from pollutants of exhaust gas emission of heavy equipments or dust during demobilization and materials transport. Based on the measurement of similar activity, exhaust gas emitted to atmosphere in this activity is relatively high.

**b. Impact Criteria**

Regulation of South Sumatra Governor No.17/2005 related to quality standard of ambient air and noise level.

**c. Management Objective**

Reducing the negative impact from management of channel and irrigation facility on the decrease of air quality at the surrounding of activity location.

**c. Management Effort**

1. Using vehicles and equipments in good condition according to the standard.
2. Maintenance for carrier vehicles and heavy equipments so that the produced emission is within the quality standard of moving source emission.
3. Continous road spraying on dusty location especially at dry season.
4. Road maintenance and repair especially in zone close to project activity location.
5. Increasing dust particles and odor can be reduced by watering and covering up the excavation materials with canvas.
6. Materials transportation is done in night time when the road users are minimum.
7. Put into effect the strict regulation of speed and tonnage for vehicles and equipments.
8. Provision and requires the workers to use safety equipment such as safety belt, hand glove, helm, masker, eyeglasses and ear plug.
9. Giving instruction to workers about the importance of maintaining air quality decrease as minimum as possible.
10. Conducting the stepwise activity according to the plan and progress of activity/project implementation.
11. Giving instruction to workers about the importance of maintaining air quality decrease as minimum as possible.
12. Collaboration with Transportation Council in implementation of equipments mobilization and channel development to minimize impact on the decrease of air quality.
13. Collaboration wth Health Council in health management and supervision of air quality level.

**e. Management Location**

At activity/project site of channel and irrigation facility ordering.

**f. Management Period**

During activity of channel and irrigation facility ordering.

**g. Funding**

Management activity is funded by initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.4.2. Noise Level and Vibration**

**a. Impact Source**

The main impact source in this stage is activity of channel and irrigation facility ordering.

**b. Impact Criteria**

Regulation of South Sumatra Governor No.17/2005 related to quality standard of ambient air and noise level.

**c. Management Objective**

Reducing the negative impact from management of channel and irrigation facility on the increase of noise level and vibration.

**d. Management Effort**

Management effort to decrease the negative impact from noise and vibration can be conducted by using the following efforts :

1. Using vehicles and equipments in good condition according to the standard.
2. Maintenance for carrier vehicles and heavy equipments.
3. Materials transportation is done in night time when the road users are minimum.
4. Put into effect the strict regulation of speed and tonnage for vehicles and equipments.
5. Provision and requires the workers to use safety equipment such as safety belt, hand glove, helm, masker, eyeglasses and ear plug.

6. Giving instruction to workers about the importance of maintaining the increase of noise and vibration as minimum as possible.
7. Collaboration with Transportation Council in implementation of equipments mobilization and channel development to minimize impact on the increase of noise and vibration.
8. Collaboration with Health Council in health management and supervision of noise level and vibration.

**e. Management Location**

At the on-going activity/project site.

**f. Management Period**

During the on-going activity stage.

**k. Funding**

Management activity is funded by initiator (Balai Besar Wilayah Sungai Sumatera VII).

**l. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**m. Management Supervisor**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**n. Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.4.3. Job Opportunity and Business Opportunity**

**a. Impact Source**

The main impact source is manpower recruitment activity.

**b. Impact Criteria**

1. Appropriateness of manpower recruitment procedure with the stated current regulation.
2. Numbers of recruited local manpower.
3. Community income level.

**c. Management Objective**

1. Manpower recruitment should be in accordance to regulation.
2. Giving priority to local manpower in project activity.

3. Activity should give positive contribution toward local community welfare.

**d. Management Effort**

1. Conducting objective manpower recruitment in order to prevent collusion and nepotisms.
2. Giving priority to local community members as manpower force.
3. Conducting open distribution of information related to manpower recruitment plan either directly or through mass media.
4. Involving the formal key persons (Head of Villages or Head of Districts) on manpower recruitment process.
5. Collaboration with Manpower Council in manpower recruitment process in order to get certain qualification and numbers of manpower according to the requirement.

**e. Management Location**

At the surrounding of on-going activity/project site.

**f. Management Period**

During the on-going activity stage.

**g. Funding**

Management activity is funded by initiator (Balai Besar Wilayah Sungai Sumatera VII).

**h. Management Operator**

Management activity operator is Balai Besar Wilayah Sungai Sumatera VII.

**i. Management Supervisor**

Environmental Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3.4.4. Community Perception**

**a. Impact Source**

The main impact source is all activities at construction stage. Negative perception of community will occur if they feel suffer financial loss or disturbed due to decrease of environmental quality at the surrounding of their settlement.

**b. Impact Criteria**

1. Appropriateness of project activity with the stated current regulation.
2. Unrest and social conflict occurrence in the community at the surrounding of activity/project location.

**c. Management Objective**

1. Preventing the occurrence of unrest and social conflict.
2. Increasing the family atmosphere relationship between initiator and local community.
3. Increasing positive impact due to the activity.

**d. Management Effort**

1. Conducting open distribution of information related to activity plan either directly or through mass media.
2. Managing activity implementation by involving local community members.
3. Collaboration with Subdistrict and Village Officers at the surrounding of activity location in activity socialization toward community in open manner.
4. Collaboration with Land Council and Satpol PP.

**e. Management Location**

At the surrounding of activity location.

**f. Management Period**

During post operational activity stage.

**g. Funding**

Balai Besar Wilayah Sungai Sumatera VII

**h. Management Operator**

Balai Besar Wilayah Sungai Sumatera VII

**i. Management Supervisor**

Environmental Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**j. Reporting**

Governor, Environmental Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

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**Appendix 1. Matrix of Environmental Management Plan in Secondary and Sub-Secondary Channels Development at Lempuing Irrigation Area.**

| Environmental Components Affected by Impact | Impact Source   | Impact Criteria  | Management Objective   | Management Effort   | Management Period                   |   | Management Location                     | Operator   | Supervisor                              | Reporting   | Institutions of Environmental Management  |
|---|---|--|--|---|-------------------------------------|---|---|--|---|---|---|
|   |   |  |  |   | At Pre Construction Activity Stage. | Activity location   |   |  |   |   |   |
| <b>A. PRE-CONSTRUCTION STAGE</b>            |   |  |  |   |                                     |   |   |  |   |   |   |
| Community Perception                        | All activities at pre construction stage which included socialization, survey and land exemption  | 1. Project activity appropriateness with the existing current regulation<br>2. Social unrest and conflict occurrence in community at the surrounding of activity location/project. | 1. Prevention of social unrest and conflict.<br>2. Improving the family atmosphere relationship between initiator and local community members.<br>3. Collaboration with Subdistrict officers and Village officers at surrounding of activity location on open socialization activity toward community members.<br>4. Collaboration with Land Council and Satpol PP of OKI Timur and OKI Districts. Collaboration with Subdistrict officers and Village officers at surrounding of activity location on open socialization activity toward community members. | 1. Conducting open information distribution of activity plan either directly or through mass media.<br>2. Managing activity implementation by involving local community members.<br>3. Providing friendship forum to get closer relationship between initiator and local community members.<br>4. Collaboration with Subdistrict officers and Village officers at surrounding of activity location on open socialization activity toward community members.<br>5. Collaboration with Land Council and Satpol PP of OKI Timur and OKI Districts. Collaboration with Subdistrict officers and Village officers at surrounding of activity location on open socialization activity toward community members. |                                     |   |   |  |   |   |   |
| <b>B. CONSTRUCTION</b>                      |   |  |  |   |                                     |   |   |  |   |   |   |
| Air Quality                                 | Equipments and materials mobilization as well as channel development that can decrease air quality either from exhaust gas emission of heavy equipments or dust during materials transportation and channel | Regulation of South Sumatra Governor No. 17/2005 related to ambient air quality standard.  | Reducing negative impact from equipments and materials mobilization and channel development toward the decrease of air quality at the surrounding location.  | Using good condition of vehicles and machinery equipments according to standard. Machine maintenance of carrier and heavy equipments so that the resulting emission is in accordance to emission quality standard of moving emission resources.<br>Conducting continue road spraying at dusty area, especially at dry season.<br>Conducting road maintenance and repair especially at zones close to project activity location.<br>Increase of dust particles and odor can be reduced through watering and covering of excavating materials with canvas.<br>Materials transportation is done in night time when the road users is in minimum numbers.   | At pre-construction activity stage. | At the site of activity/project and at surrounding of channel development activity. | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Transportation Council and Health Council of South Sumatra Province and Environmental Council of OKU and OKU Timur Districts. | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Transportati on Council and Health Council of South Sumatra Province and Environmental Council of OKU and OKU Timur Districts. | Governor, Environmental Council, Agricultural Council, Land Council of South Sumatra Province and Environmental Council of OKI and OKI Timur Districts. |

**BALAI BESAR WILAYAH SUNGAI SUMATERA VII**

ENVIRONMENTAL MANAGEMENT PLAN  
Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

| Environmental Components Affected by Impact | Impact Source            | Impact Criteria   | Management Objective  | Management Effort   | Institutions of Environmental Management  |   |  |  |           |
|---|--------------------------|---|---|---|---|---|--|--|-----------|
|   |                          |   |   |   | Management Period   | Management Location                     | Operator   | Supervisor   | Reporting |
| Development                                 |                          |   |   | <ul style="list-style-type: none"> <li>- Applying regulation of speed and tonnage limit on vehicles and machinery equipments.</li> <li>- Providing and requires the workers to use masker protection and eyeglasses.</li> <li>- Giving understanding to workers about the importance of maintaining minimum decrease of air quality.</li> <li>- Conducting stepwise activities in accordance to plan and progress of activity/project implementation.</li> <li>- Giving understanding to workers about the importance of maintaining minimum decrease of air quality.</li> <li>- Conducting collaboration with Transportation Council in equipments mobilization activity and channel development to minimize their impacts on decreasing of air quality.</li> <li>- Collaboration with Health Council in health management and supervision of air quality level.</li> </ul>  |   |   |  |  |           |
| Noise Level and Vibration                   | Equipments and materials | Regulation of South Sumatra Governor No. 17/2005 related to ambient air quality standard. | Reducing negative impact from equipments and materials mobilization and channel development toward decrease of air quality at the surrounding location. | <ul style="list-style-type: none"> <li>- Using good condition of vehicles and machinery equipments according to standard.</li> <li>- Maintenance of carrier and heavy equipments.</li> <li>- Materials transportation is done at night time when the road users is in minimum numbers.</li> <li>- Applying regulation of speed and tonnage limit on vehicles and machinery equipments.</li> <li>- Providing and requires the workers to use protector of ear plug.</li> <li>- Giving understanding to workers about the importance of maintaining minimum decrease of air quality.</li> <li>- Conducting collaboration with Transportation Council in equipments mobilization activity and channel development to minimize their impacts on decreasing of air quality.</li> <li>- Collaboration with Health Council in health management and supervision of air quality and vibration levels.</li> <li>- Conducting the medical check up (especially</li> </ul> | At the sites of activity/project and at surrounding activity location of channel development. | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Transportation Council and Health Council of South Sumatra Province and Environmental Council of OKU and OKU Timur Districts. | Governor, Environmental Council, Transportati on Council, Transportati on Council and Health Council of South Sumatra Province and Environmental Council of OKU and OKU Timur Districts. |           |

| Environmental Components Affected by Impact | Impact Source   | Impact Criteria   | Management Objective  | Management Effort   | Management Period                        | Institutions of Environmental Management   |   |  |
|---|---|---|---|---|--|--|---|--|
|   |   |   |   |   |  | Management Location  | Operator                                | Supervisor   |
| Water Quality and Hydrology                 | Activity that produce the main impact source is channel development | Impact criteria is the change of water quality parameters compared to current stated quality standard (Regulation of South Sumatra Governor No.16/2005 and Health Ministry Decree of Indonesia Republic No.907/Menkes/2002, i.e the increase in TSS and water turbidity). | Reducing negative impact from channel development toward water quality and sedimentation as well as shallowing of water body at surrounding of activity location. | <ul style="list-style-type: none"> <li>- Conducting area strict restriction to prevent unnecessary land clearing, i.e land clearing is only done according to proposed plan.</li> <li>- Conducting stepwise activities in accordance to plan and progress of activity/project implementation</li> <li>- Developing and ordering of water channels within and at the surrounding activity/project location to minimize landslide and erosion that dissolve soil particles.</li> <li>- Collaboration with Health Council of South Sumatra Province in management and supervision of water quality.</li> </ul> | During the on going development activity | At the sites of activity/project and at surrounding activity location of channel development | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Fishery and Oceanography Council and Health Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts. |
| Space, Land and Soil                        | Activity that produce the main impact source is channel development | Soil physical and chemical properties according to Soil Research Center (PPT, 1981) and erosion potential.  | Maintaining or maximizing the activity benefits toward space, land and soil which are in good maintenance and beauty condition.                                   | <ol style="list-style-type: none"> <li>1. Conducting good and proper development in accordance to the proposed plan.</li> <li>2. Replanting activity at open land/soil after the finish of channel development in order to reduce land and soil damage, especially at the slope of channel embankment to minimize erosion by using grasses or legume cover crop.</li> <li>3. Conducting routine soil analysis to determine soil condition.</li> </ol>   | During construction stage                | At the sites of on going activity or project.  | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council of South Sumatra Province.   |
| Inland Flora and Fauna                      | Activity that produce the main impact source is channel development | The existence of natural vegetation in good condition at surrounding activity location.   | Providing shelter and feed sources for wildlives.   | <ul style="list-style-type: none"> <li>- Constructing the ban or notice signs or appeal for not hunting the wildlives.</li> <li>- Producing, installing and maintaining pole sign or notice boards and notice warning related to protection/green area conservation.</li> <li>- The existence of security/supervision officers at</li> </ul>  | During construction stage                | At the sites of on going activity/project and at the surrounding of channel                  | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Forestry and Plantation Council of South  |

| Environmental Components Affected by Impact             | Impact Source  | Impact Criteria   | Management Objective  | Management Effort   | Management Period                         | Management Location  | Institutions of Environmental Management |   |
|---|--|---|---|---|---|--|--|---|
|   |  |   |   |   |   |  | Operator                                 | Supervisor  |
| Waters Biota  | Channel development activity. Turbidity increase due to suspended soil particles into waters body that cause waters quality change which has impact on waters biota balance. | Change in type composition, type abundance, diversity index and homogeneity index of plankton, benthos and neuston compared to the initial condition. | Irrigation channels and conservation areas. Maintaining and enriching the vegetation types available at green belt area with native types vegetations that have multi function. Extension service and socialization to community members. | Using good condition of vehicles and machinery equipments according to standard Conducting area strict restriction to prevent unnecessary land clearing, i.e. land clearing is only done according to proposed plan. Conducting stepwise activities in accordance to plan and progress of activity/project implementation. Developing and ordering of water channels within and at the surrounding activity/project location to minimize landslide and erosion that dissolve soil particles. Conducting stepwise activities in accordance to plan and progress of activity/project implementation Appeal the community members not to throw garbages into rivers. Collaboration with Health Council in the management and supervision of water quality. | During the on going of construction stage | At the sites of on going activity/project.   | Balai Besar Wilayah Sungai Sumatera VII  | Environmental Council, Forestry and Plantation Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts. |
| Job Opportunity, Business Opportunity and Local Economy | Activity that produce the main impact source is manpower recruitment.  | 1. Appropriateness<br>of manpower recruitment should be in accordance to current stated regulation.<br>2. Numbers of recruited local manpower.        | 1. Manpower recruitment should be in accordance to current stated regulation.<br>2. Involvement of local manpower in project.<br>3. Activity should   | 1. Conducting objective manpower recruitment without collusion and nepotism.<br>2. Giving priority to local community as manpower.<br>3. Information distribution of manpower recruitment plan in open manner either directly or through mass media.<br>4. Involving the formal key persons (Head of Village or Head of Subdistrict) in manpower recruitment process.   | During the on going of construction stage | At the sites of on going activity/project and at surrounding of channel development activity location. | Balai Besar Wilayah Sungai Sumatera VII  | Environmental Council, Manpower Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts.                |

## BALAI BESAR WILAYAH SUNGAI SUMATERA VIII

ENVIRONMENTAL MANAGEMENT PLAN  
Environmental Impact Assessment for Irrigation Development at Lempulu Area (13,500 ha)

| Environmental Components Affected by Impact | Impact Source   | Impact Criteria            | Management Objective                                   | Management Effort  | Institutions of Environmental Management   |   |                                     |   |
|---|---|----------------------------|--|--|--|---|-------------------------------------|---|
|   |   |                            |  |  | Management Period  | Management Location                       | Operator                            | Supervisor  |
| Community Health                            | Channel development. Decrease of air quality and increase of noise and dust as well as decrease of water quality at the surrounding activity location and roads will produce negative impact toward community health. | 3. Community income level. | give positive contribution to local community welfare. | 5. Collaboration with Manpower Council in manpower recruitment process in order to get qualification and numbers of manpower in accordance to the requirement. | - Using good condition of vehicles and machinery equipments according to standard<br>Conducting continue road spraying at dusty area, especially at dry season and covering up excavating materials by using canvas.<br>Materials transportation is done at night time in which road users is minimum number.<br>Providing and requires the workers to use safety belt, hand glove, helmet, masker, eye glasses and ear plug.<br>Conducting strict area restriction to prevent unnecessary land clearing, i.e.land clearing is only done according to proposed plan.<br>Collaboration with Health Council in management and supervision of community health. | During channel development activity stage | Balai Besar Wilayah Sungai Sumatera | Governor, Environmental Council, an Health Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts.     |
| Community Perception                        | Activities that produce the main impact source are all activities at construction stage.  |                            |  |  | 1. Information distribution of manpower recruitment plan in open manner either directly or through mass media.<br>2. Managing the activity implementation by involving some community members at surrounding activity location.<br>3. Collaboration with Subdistrict and Village officers to socialize the activity toward community in open manner.<br>4. Collaboration with Land Council and Saltpi PP.  | During the on going construction stage.   | Balai Besar Wilayah Sungai Sumatera | Environmental Council, Land Council and Health Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts. |

| Environmental Components Affected by Impact             | Impact Source  | Impact Criteria   | Management Objective  | Management Effort  | Institutions of Environmental Management |                                    |                                     |   |
|---|--|---|---|--|--|------------------------------------|-------------------------------------|---|
|   |  |   |   |  | Management Location                      | Management Period                  | Operator                            | Supervisor  |
| <b>C. Operational Stage</b>                             |  |   |   |  |  |                                    |                                     |   |
| 1. Water Quality and Waters Biota                       | Activity that produce the main quality parameters impact source is channel maintenance and Governor Irrigation facility operation. The use of fertilizers and pesticides during channel operation can decrease water quality and waters biota at surrounding of activity location. | Regulation of South Sumatra Governor No.16/2005 and the change of type composition, abundance, diversity index and homogeneity index of plankton, benthos and necton compared to initial condition. | The negative impact in term of decreasing water quality and waters biota due to channel and its facilities operation should be minimized. | Conducting extension service toward community with the help from related institutions and involving P3A in term of fertilizing dose as well as proper use of pesticides and the importance of clean agricultural products which not produce the negative impact on environment.  | On water body at Wilayah Sungai Sumatera | During operational activity stage. | Balai Besar Wilayah Sungai Sumatera | Environmental Council, Agricultural Council and Health Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts.   |
| Job Opportunity, Business Opportunity and Local Economy | Activity that produce the main impact source is irrigation facility operation. It will increase water supply for rice crops which will increase job and business opportunities as well as economic improvement due to increase of agricultural production.                         | Unemployment level and income/welfare level of farmers.   | This activity should give optimum positive contribution for community welfare at the surrounding of activity location.                    | 1. Socialization toward community in relation to operation of irrigation channel. Collaboration with related institutions in extension service related to optimum utilization of irrigation water.<br>2. Collaboration with related institutions in extension service related to sustainable agricultural production.<br>3. Facilitate the development of agricultural institution in order to manage even distribution of irrigation water. | At the surrounding of activity location. | During operational activity stage. | Balai Besar Wilayah Sungai Sumatera | Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts. |
| Community   | Activity that  | 1. Health level of  | 1. Minimizing   | 1. Collaboration with related institutions in  | During                                   | At the                             | Balai Besar                         | Environmental Governor,   |

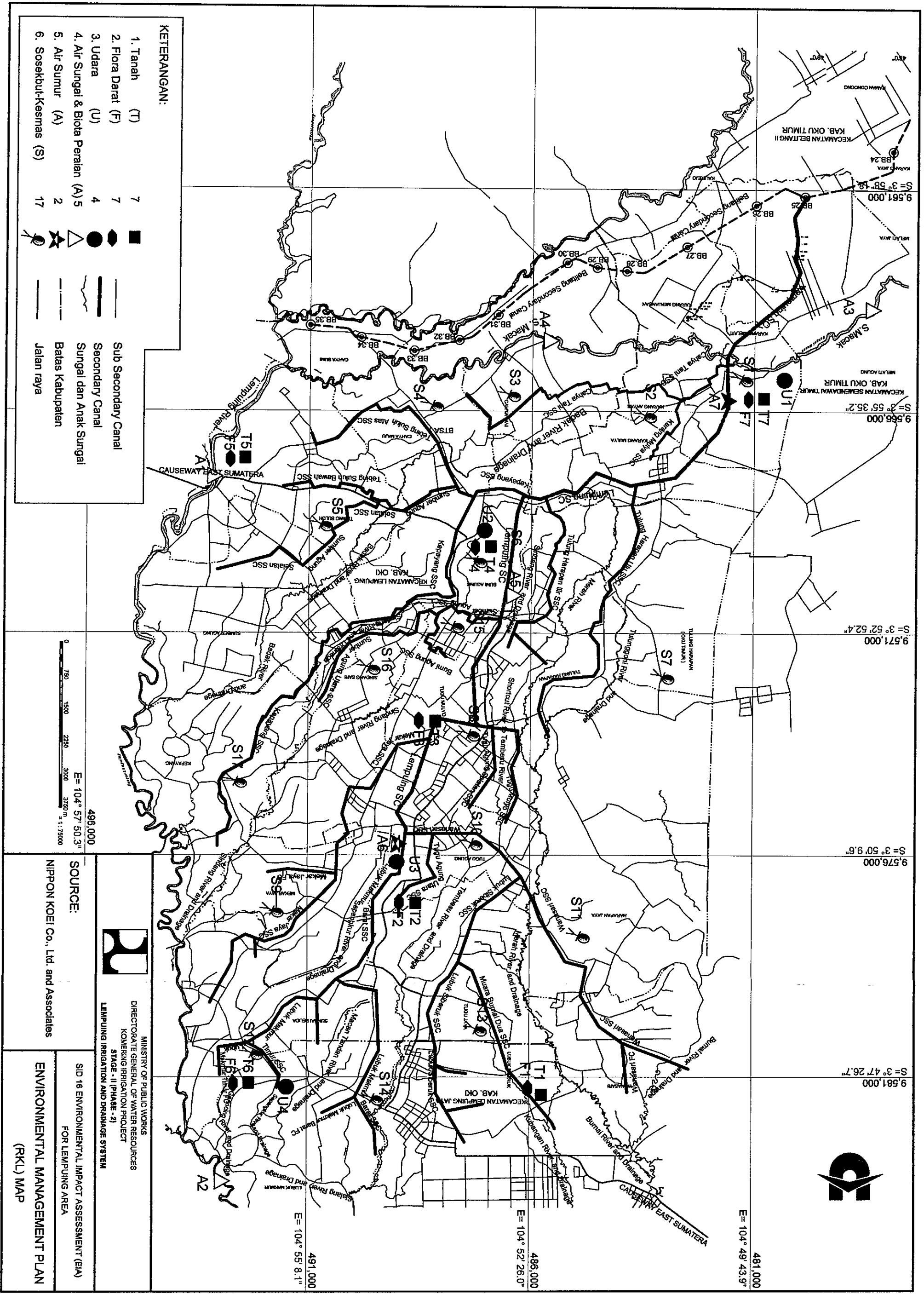
| Environmental Components Affected by Impact | Impact Source  | Impact Criteria  | Management Objective   | Management Effort   | Management Period   | Management Location  | Operator                            | Institutions of Environmental Management  | Supervisor   | Reporting   |
|---|--|--|--|---|---|--|-------------------------------------|---|--|---|
| Health and Perception.                      | produce the main impact source is operation of channels and irrigation facilities. | community at the surrounding of activity/project location.   | community at the negative impact toward community health at the surrounding of project activity/project with the current stated regulation.        | extension service related to optimum utilization of irrigation water.<br>Collaboration with related institutions in extension service related to sustainable agricultural production.<br>Facilitate the development of agricultural institution in order to manage even distribution of irrigation water.   | surrounding of activity stage.  | surrounding of activity location.  | Wilayah Sungai Sumatera             | Council, Health Council and Manpower Council of South Sumatra Province, and Environmental Council of OKU and OKU Timur Districts.                     | Council, Health Council and Manpower Council of South Sumatra Province, and Environmental Council of OKU and OKU Timur Districts.                              | Environmental Council, Health Council and Manpower Council of South Sumatra Province, and Environmental Council of OKU and OKU Timur Districts.       |
| <b>d. Post Operational Stage</b>            |  |  |  |   |   |  |                                     |   |  |   |
| Air Quality                                 | Activity that produce the main impact source is channel and irrigation facilities  | Regulation of South Sumatra Governor No.17/2005 related to ambient air quality standard and noise level. | Decreasing negative impact from activity of channel and irrigation facilities ordering toward the decrease of air quality at the surrounding area. | 1. Using good condition of vehicles and machinery equipments according to standard.<br>2. Maintenance of carrier and heavy equipments which results in emission level within emission quality standard of moving source.<br>3. Conducting continue road spraying at dusty area, especially at dry season.<br>4. Conducting road maintenance and repair activity especially on zone close to project location.<br>5. Increase of dust particles and odor can be reduced by spraying and covering up excavation materials using canvas.<br>6. Materials transportation is done at night time when the road users is in minimum numbers.<br>7. Applying regulation of speed and tonnage limit on vehicles and machinery equipments.<br>8. Providing and requires the workers to use protection equipment such as Safety Belt, hand glove, helm, masker, eyeglasses and ear plug.<br>9. Giving the understanding to workers about the importance of maintaining minimum decrease of | During the on going activity of channel and irrigation facilities ordering. | At the sites of activity/project location in activity of channel and irrigation facilities ordering as well as at the surrounding of channel development activity. | Balai Besar Wilayah Sungai Sumatera | Environmental Council, Transportation Council and Health Council of South Sumatra Province, and Environmental Council of OKU and OKU Timur Districts. | Governor, Environment Council, Transportati on Council and Health Council of South Sumatra Province, and Environmental Council of OKU and OKU Timur Districts. | Environmental Council, Transportation Council and Health Council of South Sumatra Province, and Environmental Council of OKU and OKU Timur Districts. |

| Environmental Components Affected by Impact | Impact Source   | Impact Criteria  | Management Objective   | Management Effort   | Institutions of Environmental Management                         |                                      |   |   |
|---|---|--|--|---|--|--------------------------------------|---|---|
|   |   |  |  |   | Management Period  | Management Location                  | Operator  | Supervisor  |
| Noise Level and Vibration                   | Activity that produce the main impact source in this stage is channel and irrigation facilities ordering. | Decreasing the negative impact from activity of channel and irrigation facilities ordering toward the increase of noise level and vibration. | Regulation of South Sumatra Governor No.17/2005 related to ambient air quality standard and noise level.   | 1. Using good condition of vehicles and machinery equipments according to standard.<br>2. Maintenance of carrier and heavy equipments.<br>3. Materials transportation is done at night time when the road users is in minimum numbers.<br>4. Applying strict regulation of speed and tonnage limit on vehicles and machinery equipments.<br>5. Providing and requires the workers to use protection equipment such as <i>Safety Belt, hand glove, helm, masker, eyeglasses and ear plug</i> .<br>6. Giving the understanding to workers about the importance of maintaining minimum level of noise and vibration level.<br>7. Conducting collaboration with Transportation Council in equipments mobilization activity and channel development to minimize their impacts on increasing of noise and vibration.<br>8. Collaboration with Health Council in health management and supervision of noise and vibration level. | During the on going activity.                                    | Baijai Besar Wilayah Sungai Sumatera | Environmental Council, Transportation Council and Health Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts. | Governor, Environment Council, Transportation Council and Health Council of South Sumatra Province, and Environment Council of OKI and OKU Timur Districts. |
| Job Opportunity and Business Opportunity    | Activity that produce the main impact source is manpower  | 1. Appropriateness of manpower recruitment should be in accordance to  | 1. Manpower recruitment without collusion and nepotism.<br>- Giving priority to local community as manpower.<br>- Information distribution of manpower | During the on going activity stage.   | At the sites of activity/project location and in the surrounding | Baijai Besar Wilayah Sungai Sumatera | Environmental Council, Manpower Council of  | Governor, Environment Council, Manpower Council of  |

**BALAI BESAR WILAYAH SUNGAI SUMATERA VII**

ENVIRONMENTAL MANAGEMENT PLAN  
Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

| Environmental Components Affected by Impact | Impact Source  | Impact Criteria   | Management Objective  | Management Effort   | Management Period                   | Institutions of Environmental Management  |   |
|---|--|---|---|---|-------------------------------------|---|---|
|   |  |   |   |   |                                     | Operator  | Supervisor  |
| management                                  | the current stated regulation.   | the current stated regulation.<br>2. Numbers of recruited local manpower.<br>3. Community income level. | the current stated regulation.<br>2. Provide priority to local manpower in project activity.<br>3. The activity should give positive contribution to local community at surrounding location. | recruitment plan in open manner either directly or through mass media.<br>Involving the formal key persons (Head of Village or Head of Subdistrict) in manpower recruitment process.<br>Collaboration with Manpower Council in manpower recruitment process in order to get qualification and numbers of manpower in accordance to the requirement. | of channel development activity.    | South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts. | Council of South Sumatra Province, and Environmental Council of OKI and OKU Timur Districts.                        |
| Community Perception                        | Activities that produce the main of project activity with the current stated regulation. | Activities that produce the main of project activity with the current stated regulation.                | - Appropriateness with the current stated regulation.<br>- Unrest and social conflict in community at surrounding of activity/project location.   | - Prevention of unrest and social conflict.<br>- Improvement of the family atmosphere relationship between initiator and local community.<br>- Increasing the positive impact due to activity implementation.   | At post operational activity stage. | Balai Besar Wilayah Sungai Sumatera   | Governor, Environmental Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts. |





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BALAI BESAR WILAYAH SUNGAI SUMATERA VIII  
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**FINAL REPORT  
ON**

**3. ENVIRONMENTAL MONITORING PLAN (RPL)**

**FOR  
IRRIGATION DEVELOPMENT AT LEMPUING AREA  
(13,500 ha)**

**IN  
SEMENDAWAI TIMUR SUBDISTRICT  
OGAN KOMERING ULU TIMUR DISTRICT  
AND  
LEMPUING AND LEMPUING JAYA SUBDISTRICTS  
OGAN KOMERING ILIR DISTRICT  
SOUTH SUMATRA PROVINCE**



**PT. ALLES KLAR PRIMA  
PALEMBANG, OCTOBER 2011**

# **FOREWORD**

Satker Balai Besar Wilayah Sungai VIII has plan to conduct secondary and sub-secondary channels development activity at Lempuing irrigation area. In order to fulfill the principle of sustainable and environment-friendly development, this activity should be initiated with document composing of Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL).

Results of Environmental Impact Analysis study toward the activity showed that it will produce some impacts on environment, either important positive impact or important negative impact on environmental components. Important negative impact from activity should be minimized or omitted if possible, whereas important positive impact should be developed. These documents of Environmental Managemet Plan (RKL) and Environmental Monitoring Plan (RPL) are composed to decribe the efforts to monitor, prevent, control and solve the significant negative and important negative impacts on environment and improving positive impacts as a results of this activity.

We send our grateful to all parties that had helped in composing these documents since the secondary data collecting up to field study. Our thank and respect are also conveyed to all parties that had already gave direction so that these documents can reach the directed and agreed upon target.



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# CHAPTER I

## INTRODUCTION

### 1.1. Background

Continous utilization of natural resources in Indonesia has an objective to increase population welfare at all areas of Indonesia Republic. Current natural utilization is increasing due to the increase of population number. Increase of population number produce a new challenge in land area utilization, especially for settlement land and agricultural land.

The current development and utilization of either swamp land or non-swamp land is one of the effort made by government to increase agricultural production. It is expected that food crop production, especially rice, can be increased through agricultural area extension to fulfill the demand of food which is recently increased due to relatively rapid increase in population.

The government also implemented the agricultural intensification program to increase the crop production in addition to the area extension program. This agricultural intensification program is closely related to Panca Usaha Tani program in which the irrigation is prerequisite to get the maximum agricultural production. Under these circumstances and to achieve the target, the government through Directorate General of Water Resources Development, Department of Public Works, has issued a letter No.180/KPTS/A/1990 to establish a committee for the implementation of Komering Irrigation Project with irrigation area of 120,000ha..

Komering Irrigation Project has been commenced in 1990 with the rehabilitation and improvement of Belitang Irrigation Area of about 21,000 ha as the Stage I development including the construction of Perjaya Headworks, Komering Main Canal and Ranau Regulating Facility. This Stage I was completed by 1997 and the Stage II development including North Komering Irrigation Area (16,640 ha), South Komering Irrigation Area (10,519 ha) as well as Bahuga Irrigation area and Muncak Kabau Irrigation Area (6,021 ha) has been commenced consecutively.

Development of Lempuing irrigation system (hereinafter referred as the project) of 13,500 ha is one of the development activities under Komering Irrigation Project. The purpose of the project is to improve the function of the land from a rain-fed paddy field to a technical irrigated paddy field through the development of irrigation and drainage canals using the additional water resource from Ranau Lake. The project is expected to improve the economic conditions and well-being of the surrounding communities through an increase of agricultural production, especially of rice.

Increase of food production using extensification technique through paddy field development has been conducted since some years ago. Paddy field development activity followed by irrigation channel development had changed landscape condition and can results in basic change to environmental components. Therefore, analysis toward the probable impacts should be conducted during the on-going activity. Analysis is done to determine environmental condition after and before the activity implementation so that efforts can be provided to minimize the probable negative impact from this activity.

Based on study results of Environmental Impact Analysis toward activity plan of secondary and sub-secondary channels development at Lempuing area which consisted of pre-construction, construction, operational and post operational stages, it is known that this activity will produce impacts to environmental components either important positive impact or important negative impact.

Impact monitoring effort plan, especially important negative impact, is stated in Environmental Monitoring Plan (RPL) document which is used to determine the succeed of implemented environmental management activity. This environmental monitoring can also be used to study the phenomena which occurred at several levels starting from project level, area level and even regional level depending on reference scale toward the existing problems. Impact monitoring activity is very important because this activity is happened for long time period so that each of environmental components will also change.

## **1.2. Objectives**

Environmental monitoring is conducted with an objective that implementation of secondary and sub-secondary channels development activity at Lempuing irrigation area apply the principle of environment-friendly development in order to realize sustainable

development policy. It is also hoped that this activity will capable to give optimum contribution in improving the community welfare at the surrounding of activity location.

Objectives of proposed environmental monitoring activity in term of activity management plan are as follows :

- 1) Determining the environmental monitoring effort, especially basic issue which had agreed upon in study of Environmental Impact Analysis through measurements, interview and observation either on physical, chemical, biological, socioeconomic, sociocultural and community health aspects.
- 2) Determining the equipments or methods, monitoring location and time as well as their relation with related institutions either as supervisor or as report receiver institution of monitoring activity.
- 3) Giving description related to implementation process of environmental monitoring activity that can be used as guideline in conducting environmental monitoring during the on-going activity.

### **1.3. Environmental Monitoring Purpose**

Environmental monitoring activity will be very useful for initiator, related parties or community. Environmental monitoring purpose can be described as follows.

#### **1.3.1. For Initiator**

- 1) Knowing the information related to change of environmental quality in early time.
- 2) As input data for improvement of environmental management which is related to the change of environmental quality.
- 3) As guideline in monitoring operational activity of affected environmental components quality.
- 4) Early solution of the operational failure in activity implementation of secondary and sub-secondary channels development at Lempuing irrigation area.

#### **1.3.2. For Government**

- 1) As input data in decision making process related to environmental feasibility of the proposed activity plan.
- 2) Receiving report in supervision conduct to determine the initiator obidience level to the required obligatory in environmental management.

### **1.3.3. For Community**

- 1) Utilizing the positive impact and preventing the negative impact.
- 2) Receiving proper understanding of activity impact either important positive impact or important negative impact which in turn can prevent conflict between community at the surrounding activity location and activity operator.
- 3) Knowing the probability of change in environmental condition so that community can anticipate together in case of environmental pollution due to this activity.

# CHAPTER II

## ENVIRONMENTAL MONITORING PLAN

### **2.1. Pre-Construction Stage**

Monitoring plan that will be conducted at pre-construction stage is limited to Community Perception component which is estimated to be affected by activity impact.

#### **a. Impact Source**

Socialization, survey and land exemption activities.

#### **b. The Monitored Environmental Parameter**

Ignorance (*apatism*) or acknowledge, desire and hope of community.

#### **c. Objective of Environmental Monitoring Plan**

To determine the existence of negative or positive opinion from community toward this activity and to prevent direct or indirect rejection from local community toward activity plan.

#### **d. Data Collecting and Analysis Method**

It was conducted by direct observation in the field and interview. The collected data was subsequently analysis using descriptive-qualitative method.

#### **e. Environmental Monitoring Location**

In the surrounding of channel development activity which consisted of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

#### **f. Period and Frequency of Environmental Monitoring**

Monitoring period was one time during pre-construction stage at implementation of socialization, survey and land exemption activities.

#### **g. Monitoring Institution**

##### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

##### **2). Monitoring Supervisor**

Environmental Council and Land Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

##### **3). Reporting**

Governor, Environmental Council and Land Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

**ENVIRONMENTAL MONITORING PLAN**

Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

## **2.2. Construction Stage**

### **2.2.1. Air Quality**

#### **a. Impact Source**

Activity of equipments and materials mobilization as well as channel development activity can results in decrease of air quality either from exhaust gas emmision of heavy equipments or dust during materials transportation and channel development activities.

#### **b. The Monitored Environmental Parameters**

Pollutant gases concentration in air such as NO, SO, CO, NH<sub>3</sub>, H<sub>2</sub>S, dust parameter (*dustfall*) and suspended particulates (total suspended particulate, TSP) according to ambient air quality standard of South Sumatra Governor Regulation No.17/2005 related to Ambient Air and Noise Level Quality Standard and/or Government Regulation No. 41/1999 related to Air Quality Control.

#### **c. Objective of Environmental Monitoring Plan**

Determining the ambient air quality and noise level which was subsequently compared to related quality standard, i.e. Government Regulation No.41/1999 and South Sumatra Governor Regulation No. 17/2005. Monitoring results of environmental quality were also compared to initial air quality listed in ANDAL document to determine the trend from time to time.

#### **d. Data Collecting and Analysis Method**

Air quality data was collected through monitoring and direct measurement in the field. Ambient air samples were taken by using *impinger*, *high-volumetric air sampler*, *cannister* and *particulate sampler*. Analysis of ambient air samples was conducted in laboratory of environmental chemistry analysis using method such as found in Government Regulation No.41/1999 related to Air Pollution Control and South Sumatra Governor Regulation No.17/2005 related to Quality Standard of Ambient Air and Noise Level.

#### **e. Environmental Monitoring Location**

At working area or road lane.

#### **f. Period and Frequency of Environmental Monitoring**

One time per year at construction stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**2.2.2. Noise Level and Vibration**

**a. Impact Source**

Equipments and materials mobilization activity and channel development activity.

**b. The Monitored Environmental Parameters**

Noise level is in accordance to ambient air quality standard based on Regulation of South Sumatra Governor No. 17/2005.

**c. Objective of Environmental Monitoring Plan**

Determining the noise level which was subsequently compared to related quality standard, i.e. Government Regulation No.41/1999 and Regulation of South Sumatra Governor No. 17/2005. Monitoring results of environmental quality was also compared to air quality condition in ANDAL document to determine the trend of change from time to time.

**d. Data Collecting and Analysis Method**

Noise level data was collected by monitoring and direct measurement in field. Noise level was measured by using *sound level meter* with simple measurement method. Measurement results of noise level were then processed by using statistical method to determine average noise level at working area.

**e. Environmental Monitoring Location**

At working area or road lane.

**f. Period and Frequency of Environmental Monitoring**

One time per year at construction stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**2.2.3. Water Quality and Hydrology**

**a. Impact Source**

Channel development activity.

**b. The Monitored Environmental Parameters**

It refers to Regulation of South Sumatra Governor No.16/2005 related to Water Allotment and River Water Quality Standard as well as Government Regulation No. 82/2001 related to Water Quality Management and Water Pollution Control. Health Minister Decree No.416/ Menkes/Per/IX/1990 related to prerequisites and Water Quality Supervision.

**c. Objective of Environmental Monitoring Plan**

To determine the change of river water and well water quality as a results of channel development activity.

**d. Data Collecting and Analysis Method**

Sampling of river water and well water was done for analysis at accredited laboratory. The monitored parameters of river water and well water is refers to Regulation of South Sumatra Governor No.16/2005 related to Water Allotment and River Water Quality Standard and Health Minister Decree No.416/ Menkes/Per/IX/ 1990 to prerequisites and Water Quality Supervision. Analysis method for each water quality parameter is based on Indonesia National Standard (SNI). Monitoring results data was compared to quality standard as well as to water quality condition listed in ANDAL document to determine the trend from time to time.

**e. Environmental Monitoring Location**

Covering 7 locations which consisted 5 locations at Lempuing, Macak and Air Sindang Rivers as well as 2 locations of well water at Tugu Mulyo and Karang Anyar Villages.

**f. Period and Frequency of Environmental Monitoring**

Two times per year at construction stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**2.2.4. Space, Land and Soil**

**a. Impact Source**

Channel development activity.

**b. The Monitored Environmental Parameters**

Physical and chemical properties of soil based on Soil Research Center (PPT, 1981) and soil erosion potential (USLE Method).

**c. Objective of Environmental Monitoring Plan**

To determine physical and chemical properties of soil as well as soil erosion potential as a results of channel development activity.

**d. Data Collecting and Analysis Method**

It consisted of soil sampling at 7 location points and erosion potential observation at the surrounding of activity location.

**e. Environmental Monitoring Location**

It covers soil samling at 7 location points.

**f. Period and Frequency of Environmental Monitoring**

One time per year at construction stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.

**2.2.5. Inland Flora and Fauna**

**a. Impact Source**

Channel development activities during land clearing operation.

**b. The Monitored Environmental Parameters**

The existence of natural vegetations in good condition at protected area (conservation area) especially at left and right sides of river.

**c. Objective of Environmental Monitoring Plan**

To determine either or not the environmental management program had been implemented properly, i.e. by set aside green belt area and protected area at the left and right sides of river as well as minimizing the extinction of wildlives and natural vegetations.

**d. Data Collecting and Analysis Method**

Data collecting was done by calculating the change of type numbers, composition and structure of vegetations. Data collecting of wildlives was done at sampling unit in the form of strip transect having about 200-300 meter length and 25 m width. It was based on the highest activity average for most of wildlife types in order to ease the observation. Observation was done in early morning of about 05.30-09.00 a.m. The collected data was consisted of wildlife types, individual numbers of each wildlife types, wildlife types status (protected or not) and wildlife position. Data analysis was done by comparing types abundance between wildlife types found during monitoring activity and the one that found during ANDAI study.

**e. Environmental Monitoring Location**

At the surrounding of activity location, especially in the vicinity of river border.

**f. Period and Frequency of Environmental Monitoring**

One time per year at construction stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council, Forestry and Plantation Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council, Forestry and Plantation Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**2.2.6. Waters Biota**

**a. Impact Source**

Decrease of water quality as a results of channel development activity.

**b. The Monitored Environmental Parameters**

Type abundance, diversity index and water biota dominance (plankton, benthos and necton) compared to initial condition before activity implementation.

**c. Objective of Environmental Monitoring Plan**

To determine water biota quality as a result of water quality change during construction stage in comparison to its condition at initial environmental condition before activity implementation.

**d. Data Collecting and Analysis Method**

The studied water biota components were plankton, benthos and necton (fish type). Data for plankton and benthos will be obtained by observation or sampling in the field and will be subsequently analyzed at laboratory. Data for fishes will be obtained by sampling or interview with local community.

**Plankton**

Plankton sampling was done by taking water samples followed by sieving with plankton net. Water of plankton samples were put into sampling bottles and preserved by using lugol/formalin 4 %. Data analysis of plankton was used to

determine several parameters of community structure such as plankton abundance, diversity, homogeneity and dominance.

### **Benthos**

Benthos sampling was done by taking waters base sediment using *Petersen Grab*. These sediment samples were put into plastic pouch and added with 4% formaline solution and rose bengal as preservative. These samples were subsequently analyzed at laboratory. Data analysis of benthos samples was used to determine several parameters of its community structure such as type composition, density and diversity index.

### **Necton (Fish Resource)**

The collected data of fish resource was consisted of fish types found in river at the surrounding of activity plan location. It was obtained by direct observation and interview with workers and local community members.

#### **e. Environmental Monitoring Location**

At 5 points in Lempuing, Macak and Air Sindang rivers.

#### **f. Period and Frequency of Environmental Monitoring**

Two time a year at construction stage (per semester).

#### **g. Monitoring Institution**

##### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

##### **2). Monitoring Supervisor**

Environmental Council, Forestry and Plantation Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

##### **3). Reporting**

Governor, Environmental Council, Forestry and Plantation Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

### **2.2.7. Job Opportunity, Business Opportunity and Local Economy**

#### **a. Impact Source**

The main impact source is manpower recruitment activity.

**b. The Monitored Environmental Parameters**

1. Appropriateness of manpower recruitment procedure with the stated current regulation.
2. Numbers of recruited local manpower.
3. Community income level.

**c. Objective of Environmental Monitoring Plan**

Maintaining and/or maximizing the benefit of channel development for local economy through manpower recruitment, especially local manpower.

Decreasing or minimizing conflict potential between project and manpower as well as local community members.

Determining the success of environmental management activity that can be used as improvement data input in the future.

**d. Data Collecting and Analysis Method**

It was conducted by field observation, interview and document study related to manpower recruitment. The collected data was subsequently analyzed by using descriptive-qualitative method.

**e. Environmental Monitoring Location**

At villages as manpower supplier in the surrounding of activity location at Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

**f. Period and Frequency of Environmental Monitoring**

One time a year at construction stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council and manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

### **2.2.8. Community Health**

#### **a. Impact Source**

Channel development activity. Decreasing air quality and increasing noise level and dust at the surrounding of activity location and road lane will have negative impact on community health.

#### **b. The Monitored Environmental Parameter**

Parameter that will be monitored was complain from community and workers related to disease occurrence caused by water and air pollution as a results of development activity.

#### **c. Objective of Environmental Monitoring Plan**

Monitoring objectives were to determine implementation effort of disease occurrence prevention caused by decrease of water and air quality as well as implementation effort of preventing the poor environmental sanitation due to development activity.

#### **d. Data Collecting and Analysis Method**

It was conducted by observation, field observation, interview and secondary data from the closest Community Health Center. The collected data was subsequently analyzed by using descriptive-qualitative method.

#### **e. Environmental Monitoring Location**

Monitoring location was at villages in the surrounding of activity location in Semendawai Timur, Lempuing and Lempuing Jaya Districts.

#### **f. Period and Frequency of Environmental Monitoring**

Monitoring period was one time a year at construction stage.

#### **g. Monitoring Institution**

##### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

##### **2). Monitoring Supervisor**

Environmental Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

##### **3). Reporting**

Governor, Environmental Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

### **2.2.9. Community Perception**

#### **a. Impact Source**

Channel development activity. Decrease of environmental quality can affected the community perception.

#### **b. The Monitored Environmental Parameter**

The existence of problem claim numbers and frequencies from community in the surrounding of activity location which accept or reject certain activities of project activity series during construction stage.

#### **c. Objective of Environmental Monitoring Plan**

To determine the probability of community rejection toward construction activity and to prevent community rejection toward activity plan as well as to prevent social conflict occurrence.

#### **d. Data Collecting and Analysis Method**

It was conducted by observation, field observation, interview. The collected data was subsequently analyzed by usng descriptive-qualitative method.

#### **e. Environmental Monitoring Location**

Villages in the surrounding of project location at Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

#### **f. Period and Frequency of Environmental Monitoring**

One time a year at construction stage or accidentally in case of social problem occurrence that needs spesific treatment such as demonstration and others.

#### **g. Monitoring Institution**

##### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

##### **2). Monitoring Supervisor**

Environmental Council, Land Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

##### **3). Reporting**

Governor, Environmental Council, Land Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

## **2.3. Operational Stage**

### **2.3.1. Water Quality**

#### **a. Impact Source**

Crops rearing by using fertilizers, herbicides and pesticides.

#### **b. The Monitored Environmental Parameter**

It refers to South Sumatra Governor Regulation No.16/2005 related to Water Allotment and River Water Quality Standard and Health Minister Decree No.416/Menkes/ Per/IX/1990 related to prerequisites and Supervision of Water Quality.

#### **c. Objective of Environmental Monitoring Plan**

To determine the change of river water and well water quality as a results of channel operational activity.

#### **d. Data Collecting and Analysis Method**

Sampling of river water and well water followed by analysis at accredited laboratory. The observed parameters of river water and well water quality are based on Regulation of South Sumatra Province No.16/2005 as well as Health Minister Decree No.416/Menkes/ Per/IX/1990 for well water. Analysis method for each water quality parameter is based on Indonesia National Standard (SNI). Monitoring results data was compared to quality standard as well as to water quality condition listed in ANDAL document to determine the trend from time to time.

#### **e. Environmental Monitoring Location**

Covering 7 locations which consisted 5 locations at Lempuing, Macak and Air Sindang Rivers as well as 2 locations of well water at Tugu Mulyo and Karang Anyar Villages.

#### **f. Period and Frequency of Environmental Monitoring**

Two times a year at operational stage.

#### **g. Monitoring Institution**

##### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

##### **2). Monitoring Supervisor**

Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

**ENVIRONMENTAL MONITORING PLAN**

Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

### **3). Reporting**

Governor, Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

#### **2.3.2. Waters Biota**

##### **a. Impact Source**

Decreasing water quality due to operational activity which consisted of crops rearing by using fertilizers, herbicides and pesticides.

##### **b. The Monitored Environmental Parameter**

Type abundance, diversity index and water biota dominance (plankton, benthos and necton) compared to initial condition before activity implementation.

##### **c. Objective of Environmental Monitoring Plan**

To determine water biota quality as a results of change in water quality during operational stage compared to its quality at initial environmental condition before activity implementation.

##### **d. Data Collecting and Analysis Method**

Water biota components to be studied were plankton, benthos and necton (fish type). Data collecting and analysis method was similar to that of water biota monitoring at construction stage which consisted of field sampling followed by laboratory analysis to determine type abundance, diversity index, dominance and homogeneity. The results were also compared to initial environmental condition before the project existence.

##### **e. Environmental Monitoring Location**

At 5 location points at Lempuing, Macak and Air Sindang rivers.

##### **f. Period and Frequency of Environmental Monitoring**

Two times a year at operational stage.

##### **g. Monitoring Institution**

###### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

###### **2). Monitoring Supervisor**

Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

**ENVIRONMENTAL MONITORING PLAN**

Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

### **3). Reporting**

Governor, Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

#### **2.3.3. Job Opportunity and Business Opportunity**

##### **a. Impact Source**

The main impact source was activity of irrigation facility operation. It will increase water supply for rice crop that can increase job and business opportunities which in turn increase the economy due to increase of agricultural production.

##### **b. The Monitored Environmental Parameter**

Unemployment level and farmers income/welfare level.

##### **c. Objective of Environmental Monitoring Plan**

Determining the succeed of environmental management activity that can be used as improvement data input in the future.

Maintaining and/or maximizing the benefit of channel development for local economy through manpower recruitment, especially local manpower.

Decreasing or minimizing conflict potential between project and manpower as well as local community members.

##### **d. Data Collecting and Analysis Method**

It was conducted by field observation, interview and document study related to manpower recruitment. The collected data was subsequently analyzed by using descriptive-qualitative method.

##### **e. Environmental Monitoring Location**

At villages in Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

##### **f. Period and Frequency of Environmental Monitoring**

One time a year at operational stage.

##### **g. Monitoring Institution**

###### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

###### **2). Monitoring Supervisor**

Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**

**ENVIRONMENTAL MONITORING PLAN**

Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

### **3). Reporting**

Governor, Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

#### **2.3.4. Local Economy**

##### **a. Impact Source**

The main impact source was operational activity of irrigation facility. It will increase water supply for rice crop that can increase job and business opportunities which in turn increase the economy due to increase of agricultural production.

##### **b. The Monitored Environmental Parameter**

- (1). Recruited local manpower.
- (2). Opening of area physical accessibility in form of road, and
- (3). Opening of area accessibility for economic development such as facilities and infrastructures which support the economic activity implementation.

##### **c. Objective of Environmental Monitoring Plan**

To recruit local manpower recruitment and to open the area accessibility for area/local economic development.

##### **d. Data Collecting and Analysis Method**

It was conducted by observation, interview and document study related to manpower recruitment. Conducting direct observation related to operational activity that open the area accessibility for area/local economic development.

##### **e. Environmental Monitoring Location**

At villages in Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

##### **f. Period and Frequency of Environmental Monitoring**

One time a year at operational stage.

##### **g. Monitoring Institution**

###### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

###### **2). Monitoring Supervisor**

Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

### **3). Reporting**

Governor, Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

#### **2.3.5. Community Health**

##### **a. Impact Source**

Impact source was the use of pesticides and herbicides on crops maintenance during irrigation channel operation.

##### **b. The Monitored Environmental Parameter**

Parameter to be monitored was the community complain related to disease occurrence due to water pollution.

##### **c. Objective of Environmental Monitoring Plan**

Monitoring objectives were to determine implementation effort of disease occurrence prevention caused by decrease of water quality as well as implementation effort of preventing the poor environmental sanitation due to channel operation.

##### **d. Data Collecting and Analysis Method**

It was conducted by observation, field observation, interview and secondary data from the closest Community Health Center. The collected data was subsequently analyzed by using descriptive-qualitative method.

##### **e. Environmental Monitoring Location**

Monitoring location was at villages in Semendawai Timur, Lempuing and Lempuing Jaya Districts.

##### **f. Period and Frequency of Environmental Monitoring**

Monitoring period was one time a year at operational stage.

##### **g. Monitoring Institution**

###### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

###### **2). Monitoring Supervisor**

Environmental Council, Health Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

### **3). Reporting**

Governor, Environmental Council, Health Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

#### **2.3.6. Community Perception**

##### **a. Impact Source**

Impact source was the use of pesticides and herbicides on crop maintenance during irrigation channel operation.

##### **b. The Monitored Environmental Parameter**

The existence of problem claim numbers and frequencies from community in the surrounding of activity location which accept or reject certain activities of project activity series during operational stage. Supporting or rejection level from community related to channel operational activity.

##### **c. Objective of Environmental Monitoring Plan**

To determine the probability of community rejection toward channel operational activity and to prevent community rejection toward activity plan as well as to prevent social conflict occurrence.

##### **d. Data Collecting and Analysis Method**

It was conducted by observation, field observation, interview. The collected data was subsequently analyzed by using descriptive-qualitative method.

##### **e. Environmental Monitoring Location**

Villages in Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

##### **f. Period and Frequency of Environmental Monitoring**

One time a year at operational stage or accidentally in case of social problem occurrence that needs specific treatment such as demonstration and others.

##### **g. Monitoring Institution**

###### **1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

###### **2). Monitoring Supervisor**

Environmental Council, Health Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

### **3). Reporting**

Governor, Environmental Council, Health Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

#### **2.4. Post Operational Stage**

##### **2.4.1. Air Quality**

###### **a. Impact Source**

Activity of equipments and materials mobilization as well as channel ordering activity can results in decrease of air quality either from exhaust gas emmision of heavy equipments or dust during materials transportation and channel ordering activities.

###### **b. The Monitored Environmental Parameter**

Pollutant gases concentration in air such as NO, SO, CO, NH<sub>3</sub>, H<sub>2</sub>S, dust parameter (*dustfall*) and suspended particulates (total suspended particulate, TSP) according to ambient air quality standard of South Sumatra Governor Regulation No.17/2005 related to Ambient Air and Noise Level Quality Standard and/or Government Regulation No. 41/1999 related to Air Quality Control.

###### **c. Objective of Environmental Monitoring Plan**

Determining the ambient air quality and noise level which was subsequently compared to related quality standard, i.e. Government Regulation No.41/1999 and South Sumatra Governor Regulation No. 17/2005. Monitoring results of environmental quality were also compared to initial air quality listed in ANDAL document to determine the trend from time to time.

###### **d. Data Collecting and Analysis Method**

Air quality data was collected through monitoring and direct measurement in the field. Ambient air samples were taken by using *impinger*, *high-volumetric air sampler*, *cannister* and *particulate sampler*. Analysis of ambient air samples was conducted in laboratory of environmental chemistry analysis using method such as found in Government Regulation No.41/1999 related to Air Pollution Control and South Sumatra Governor Regulation No.17/2005 related to Quality Standard of Ambient Air and Noise Level.

**e. Environmental Monitoring Location**

At working area or road lane.

**f. Period and Frequency of Environmental Monitoring**

One time a year at post operational stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**2.4.2. Noise Level and Vibration**

**a. Impact Source**

Equipments and materials mobilization activity and channel ordering activity.

**b. The Monitored Environmental Parameter**

Noise level was in accordance to ambient air quality standard based on Regulation of South Sumatra Governor No. 17/2005.

**c. Objective of Environmental Monitoring Plan**

Determining the noise level which was subsequently compared to related quality standard, i.e. Government Regulation No.41/1999 and Regulation of South Sumatra Governor No. 17/2005. Monitoring results of environmental quality was also compared to air quality condition in ANDAL document to determine the trend of change from time to time.

**d. Data Collecting and Analysis Method**

Noise level data was collected by monitoring and direct measurement in field. Noise level was measured by using *sound level meter* with simple measurement method. Measurement results of noise level were then processed by using statistical method to determine average noise level at working area.

**e. Environmental Monitoring Location**

At working area or road lane.

**f. Period and Frequency of Environmental Monitoring**

One time a year at post operational stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council, Transportation Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council, Transportation Council and Health Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**2.4.3. Job Opportunity and Business Opportunity**

**a. Impact Source**

The main impact source was manpower recruitment activity.

**b. The Monitored Environmental Parameter**

Appropriateness of manpower severance procedure with the stated current regulation. Community income level.

**c. Objective of Environmental Monitoring Plan**

Decreasing or minimizing conflict potential between project and manpower as well as local community members.

**d. Data Collecting and Analysis Method**

It was conducted by field observation, interview and document study related to manpower recruitment. The collected data was subsequently analyzed by using descriptive-qualitative method.

**e. Environmental Monitoring Location**

At villages as manpower supplier in the surrounding of activity location at Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

**f. Period and Frequency of Environmental Monitoring**

One time a year at post operational stage.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**2.4.4. Community Perception**

**a. Impact Source**

Impact source was channel ordering activity and manpower management.

**b. The Monitored Environmental Parameter**

Numbers and frequencies of claim from community problems in the surrounding of activity location which accept or reject certain activities in every activity series. Supporting or rejection level of community.

**c. Objective of Environmental Monitoring Plan**

To determine the probability of community rejection toward activities.

**d. Data Collecting and Analysis Method**

It was conducted by observation, field observation, interview. The collected data was subsequently analyzed by using descriptive-qualitative method.

**e. Environmental Monitoring Location**

Villages at Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.

**f. Period and Frequency of Environmental Monitoring**

One time a year at post operational stage or accidentally in case of social problem occurrence that needs specific treatment.

**g. Monitoring Institution**

**1). Monitoring Operator**

Balai Besar Wilayah Sungai Sumatera VII

**2). Monitoring Supervisor**

Environmental Council, Health Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**3). Reporting**

Governor, Environmental Council, Health Council and Manpower Council of South Sumatra Province as well Environmental Council of OKI and OKU Timur Districts.

**Appendix 1. Matrix of Environmental Monitoring Plan in Secondary and Sub-Secondary Channels Development at Lempuing Irrigation Area.**

| No. | Environmental Components | The Monitored Important Impact | Impact Source   | The Monitored Environmental Parameter   | Environmental Monitoring Objective   | Institution of Environmental Monitoring   |   |   |  |   |   |  |
|-----|--------------------------|--------------------------------|---|---|--|---|---|---|--|---|---|--|
|     |                          |                                |   |   |  | Environmental Monitoring Method   | Data Collecting and Analysis Method   | Monitoring Location   | Monitoring Period and Frequency  | Operator                                | Supervisor  | Reporting  |
| A.  | Pre Construction Stage   | Community Perception           | Socialization either positive or negative during socialization, survey and land exemption | Socialization, survey and land exemption activities   | Community Ignorance ( <i>apathism</i> ) or knowing, desire and hope  | To determine whether or not the negative or positive opinion of community is exist in relation to activity and to prevent direct or indirect rejection from local community toward activity plan  | Direct observation in field and interview. The collected data was analyzed by using descriptive and qualitative methods.  | At surrounding of channel development location which included Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts | Monitoring period was one time at pre construction stage during socialization, survey and land exemption | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council and Land Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts.                           | Governor, Environmental Council, Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts.                                    |
| B.  | Construction Stage       | 1. Air Quality                 | 1. Increasing concentration of dust in ambient air.                                       | Equipment and materials mobilization as well as channel development that can decrease air quality from pollutant of exhaust gas emission of heavy equipments or dust during materials transportatio | Pollutant gases in air such as NO, SO <sub>2</sub> , CO, NH <sub>3</sub> , H <sub>2</sub> S, dust parameter ( <i>dustfall</i> ), and suspended particulates (total suspended particulate, TSP) | Determination of ambient air quality and noise which was subsequently compared to related quality standard that consisted of Government Regulation No. 41/1999 and Regulation of South Sumatra Governor No. 17/2005. Observation results of environmental | Air quality data was collected through monitoring and direct measurement in field. Ambient air samples were taken by using equipments of <i>impinger</i> , <i>high-volumetric air sampler</i> , <i>cannister</i> and <i>particulate sampler</i> . | At working area or road lane.   | One time a year in construction stage.   | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Transportation Council and Health Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts. | Governor, Environmental Council, Transportati on Council and Health Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts. |

**BALAI BESAR WILAYAH SUNGAI SUMATERA VII**

ENVIRONMENTAL MONITORING PLAN  
Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

| No. | Environmental Components  | The Monitored Important Impact                               | Impact Source  | The Monitored Environmental Parameter   | Environmental Monitoring Objective  | Environmental Monitoring Method  |  | Monitoring Period and Frequency       | Institution of Environmental Monitoring |   |   |
|-----|---------------------------|--|--|---|---|--|--|---------------------------------------|---|---|---|
|     |                           |  |  |   |   | Data Collecting and Analysis Method  | Environmental Monitoring Location  |                                       | Operator                                | Supervisor  | Reporting   |
| 2.  | Noise Level and Vibration | Increase of noise level at surrounding of activity location. | Equipment and materials mobilization activity as well as channel development activity. | related to Ambient Air Quality Standard and Noise Level Quality Standard or Government Regulation No. 41/1999 related to Air Quality Control. | quality were also compared to initial air quality in ANDAL document to determine the trend from time to time. | 17/2005 related to Quality Standard of Ambient Air and Noise Level.  | At working area or road lane   | One time a year in construction stage | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Transportation Council and Health Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts. | Governor, Environment Council, Transportation Council and Health Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts. |
|     |                           |  |  |   |   | Noise level data was collected through monitoring and direct measurement in the field.   | Noise level was measured by using sound level/ meter through simple measurement method. Measurement results of noise level was subsequently processed using statistical method to determine average noise level at working area. |                                       |   |   |   |
|     |                           |  |  |   |   | Observation results of environmental quality were also compared to initial air quality in ANDAL document to determine the trend from time. |  |                                       |   |   |   |

| No. | Environmental Components     | The Monitored Impact   | Impact Source                | The Monitored Environmental Parameter   | Environmental Monitoring Objective   | Environmental Monitoring Method   |   |   | Monitoring Period and Frequency  | Institution of Environmental Monitoring  |  |  |
|-----|------------------------------|--|------------------------------|---|--|---|---|---|--|--|--|--|
|     |                              |  |                              |   |  | Data Collecting and Analysis Method   | Environmental Monitoring Location   | Operator                                |  | Supervisor   | Reporting  |  |
| 3.  | Water Quality and Hydrology. | Decrease of water quality which was shown by Increase of turbidity level and TSS as well as organic matter in rivers and wells as run-off acceptor from construction activity. | Channel development activity | Based on Regulation of South Sumatra Governor No. 16/2005 related to Water Allotment and River Water Quality Standard and Government Regulation No.82/2001 related to Water Quality Management and Water Pollution Control. | Determine the quality change of river water and well water as a results of channel development activity. | Sampling of river water and well water for analysis in accredited laboratory. Parameters of the monitored river water and well water quality is refers to Regulation of South Sumatra Governor No.16/2005 related to Water Allotment and River Water Quality Standard as well as Health Minister Decree No. 416/Menkes/Per/IX/1990 related to Water Quality Prerequisite and Supervision. | At 7 location points, i.e. 5 points at Lempung, Macak and Air Sindang Rivers as well as 2 points of well water at Tugu Mulyo and Karang Anyar Villages. | Two times a year at construction stage. | Balai Besar Wilayah Sungai Sumatera VII                                  | Environmental Council, Health Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts. | Governor, Environment Council, Health Council of South Sumatra Province, Environmental Council of OKI and OKU Timur Districts. |  |
| 4.  | Space, Land and Soil         | Characteristics of physical and chemical properties of soil as well as   | Channel development activity | Characteristics of physical and chemical properties of soil according to  | Determine the characteristics of physical and chemical properties of soil                                | Soil sampling was done at 7 location points and erosion potential observation at the surrounding of activity location   | One time per year during construction stage   | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council of South Sumatra Province as well as Environmental | Governor, Environment Council of South Sumatra Province, Governor, Environment Council of South Sumatra                |  |  |

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**  
ENVIRONMENTAL MONITORING PLAN  
Development at Lempung Area (13,500 ha)

| No. | Environmental Components | The Monitored Impact   | Impact Source | The Monitored Environmental Parameter                 | Environmental Monitoring Objective  | Environmental Monitoring Method  |   | Monitoring Period and Frequency              | Operator                                | Supervisor   | Reporting  |
|-----|--------------------------|--|---------------|---|---|--|---|--|---|--|--|
|     |                          |  |               |   |   | Data Collecting and Analysis Method  | Environmental Monitoring Location   |  |   |  |  |
| 5.  | Inland Flora and Fauna   | The lost of specific vegetation from land. It is subsequently has impact on the lost of wildlives previously available in this location. |               | Channel development activities such as land clearing. | To determine whether the environmental management program was conducted properly, i.e. by providing green belt areas and conservation area at left and right sides of river as well as to minimize the extinct of wildlife types and natural vegetations. | Data collecting is done by calculating the change of type number, composition and structure of vegetation. Wildlives data collecting was conducted at sample unit having strip transect form with length of ± 200-300 meter and 25 m width. Observation was conducted during morning time between 05:30-09:00. This was based on average of highest activity of wildlives in general which provide the ease observation. The noted data was consisted of wildlife types, individual numbers for each wildlife type, wildlife types status (protected or not yet protected) and finding position of wildlife types. | At area at the surrounding of activity, especially In the nearby of river border. | One time per year during construction stage. | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council as well as Forestry and Plantation Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts. | Governor, Environmental Council as well as Forestry and Plantation Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts, and Environmental Council of OKI and OKU Timur Districts. |

| No. | Environmental Components | The Monitored Important Impact  | Impact Source   | Environmental Monitoring Objective  | Data Collecting and Analysis Method  | Environmental Monitoring Location                     | Monitoring Period and Frequency                        | Operator                                | Supervisor   | Reporting  |
|-----|--------------------------|---|---|---|--|---|--|---|--|--|
| 6.  | Waters Biota             | Quality decrease of surface water biota (plankton, benthos and neoton). | Water quality decrease as a result of channel development activity. | Determine the water biota quality due to change of water quality during construction stage compared to its condition at initial environmental condition before activity implementation. | <p><b>Plankton</b><br/>The components of studied water biota were plankton, benthos and neoton (fish type). Plankton and benthos data will be collected by observation/sampling in the field and subsequently samples were analyzed in laboratory. Data collecting for fishes was conducted by sampling or interview with local community.</p> <p><b>Benthos</b><br/>Benthos sampling was done by taking waters base sediment using Petersen Grab. The sediment samples was then put into plastic pouch and added with preservative in form of 4% formalin solution and rose Bengal. Samples were then analyzed in laboratory. Data analysis toward benthos samples will be conducted to</p> | At 5 points in Lempung, Macak and Air Sindang Rivers. | Two times a year at construction stage (per semester). | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council as well as Forestry and plantation Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts, | Governor, Environmental Council as well as Forestry and plantation Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts, and Environmental Council of OKI and OKU Timur Districts. |

| No. | Environmental Components                                 | The Monitored Impact                           | Impact Source   | The Monitored Environmental Parameter | Environmental Monitoring Objective   | Environmental Monitoring Method  |   |   | Monitoring Period and Frequency                 | Operator                                | Supervisor   | Reporting  |
|-----|--|--|---|---------------------------------------|--|--|---|---|---|---|--|--|
|     |  |  |   |                                       |  | Data Collecting and Analysis Method  | Environmental Monitoring Location   |   |   |   |  |  |
| 7.  | Job Opportunity, Business Opportunity and Local Economy. | Manpower recruitment and business opportunity. | Activity that has a role as main impact source was manpower recruitment activity. | Area and local economy development.   | <p>1. Appropriateness of manpower recruitment process with the stated current regulation.</p> <p>2. Numbers of recruited local manpower.</p> <p>3. Community income level.</p> | <p>Maintaining or maximizing the benefit from channel development for local economy through manpower recruitment, especially local manpower.</p> <p>It gives high multiplier effect on local area development.</p> | <p>It was conducted by field observation, interview and documents study related to manpower recruitment. This data was then analyzed by using descriptive-qualitative method.</p> | <p>At villages of manpower supplier in the surrounding of activity location covering Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.</p> | <p>One time per year at construction stage.</p> | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council and Manpower Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts. | Governor, Environmental Council and Manpower Council of South Sumatra Province and Environmental Council of OKI and OKU Timur Districts. |

## BALAI BESAR WILAYAH SUNGAI SUMATERA VIII

### ENVIRONMENTAL MONITORING PLAN

Development at Lempuing Area (13,500 ha)

| No. | Environmental Components | The Monitored Important Impact                                      | Impact Source | The Monitored Environmental Parameter  | Environmental Monitoring Objective  | Environmental Monitoring Method  |   |   | Institution of Environmental Monitoring                            |                                     |  |
|-----|--------------------------|---|---------------|--|---|--|---|---|--|-------------------------------------|--|
|     |                          |   |               |  |   | Data Collecting and Analysis Method  | Environmental Monitoring Location   | Monitoring Period and Frequency   | Operator   | Supervisor                          | Reporting  |
| 8.  | Community Health         | Community health level at surrounding of activity/project location. |               | Channel development activity. Decrease of air quality and increase of noise and dust as well as decrease of water quality in the surrounding of activity location and road lane will have negative impact on community health. | Parameter that will be observed was community members and workers who deliver complain related to diseases caused by water and air pollution due to the development activity. | Monitoring objective was to determine implementation of disease prevention measures due to decrease of water quality and air quality as well as to determine the implementation of preventive measures toward poor environmental sanitation as a results of this development activity. | It was conducted by observation, field observation and interview as well as secondary data from the closest Community Health Center. The obtained data was then analyzed by using descriptive-qualitative method. | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts. | Monitoring period was one time per year during construction stage. | Balai Besar Wilayah Sungai Sumatera | Governor, Environmental Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. |

| No. | Environmental Components | The Monitored Important Impact                     | Impact Source   | The Monitored Environmental Parameter  | Environmental Monitoring Objective   | Environmental Monitoring Method  |  |  | Institution of Environmental Monitoring |  |           |
|-----|--------------------------|--|---|--|--|--|--|--|---|--|-----------|
|     |                          |  |   |  |  | Data Collecting and Analysis Method  | Environmental Monitoring Location  | Monitoring Period and Frequency  | Operator                                | Supervisor   | Reporting |
| 9.  | Community Perception     | Positive and negative perceptions toward activity. | Channel development activity. Decrease of environment air quality can affect community perception.                      | The existence of claim numbers and frequencies of problems from the community in the surrounding activity which accept or reject certain activities at each project activity series during construction stage. | To determine the probability of community rejection toward construction activity and to prevent the community rejection toward this activity plan as well as to prevent the occurrence of social conflict. | It was conducted by observation, field observation and interview. The obtained data was then analyzed by using descriptive-qualitative method. | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts.                                      | One time per year at construction stage or accidentally if social problems were occurred which need specific treatment such as demonstration and others. | Balai Besar Wilayah Sungai Sumatera     | Governor, Environment Council, Land Council and Health Council, Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. |           |
| C.  | Operational Stage        | Water Quality                                      | Decrease of river water quality due to fertilizers and pesticides usage during implementation of rice crop cultivation. | Crop maintenance by using fertilizers, herbicides and pesticides.  | It refers to : Regulation of South Sumatra Province Governor No. 16/2005 related to Water Allotment and River Water Quality Standard, and KepmenkesNo : 416/Menkes/Per/IX/1990                             | To determine the change of river water and well water as a results of channel operational activity.  | At 7 location points, i.e. 5 points at Lempuing, Macak and Air Sindang Rivers as well as 2 points of well water at Tugu Mulyo and Karang Anyar Villages. | Two times per year at operational stage.   | Balai Besar Wilayah Sungai Sumatera     | Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.          |           |

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**  
ENVIRONMENTAL MONITORING PLAN  
Environmental Impact Assessment for Irrigation Development at Lempuling Area (13,500 ha)

| No. | Environmental Components     | The Monitored Impact   | Impact Source  | The Monitored Environmental Parameter                     | Environmental Monitoring Objective  | Environmental Monitoring Method   |  | Monitoring Period and Frequency                        | Operator                                 | Supervisor  | Institution of Environmental Monitoring   | Reporting   |
|-----|------------------------------|--|--|---|---|---|--|--|--|---|---|---|
|     |                              |  |  |   |   | Data Collecting and Analysis Method   | Environmental Monitoring Location  |  |  |   |   |   |
| 2.  | Water Biota                  | Derivative impact from decrease of water quality is decrease of surface water biota quality (plankton, benthos, and neoton). | Decrease of water quality is cause by operational activity : crop maintenance by using fertilizers, herbicides and pesticides.   | Related to Prerequisite and Supervision of Water Quality. | compared to quality standard as well as with water quality condition in ANDAL Document to forecast the trend from time to time. | To determine water biota quality due to the change of water quality during operational stage (plankton, benthos and neoton) was compared to initial condition before activity implementation. | Water biota components that will be studied were plankton, benthos and neoton (fish type). Data collecting and analysis method was similar to water biota monitoring at construction stage which consisted of field sampling followed by laboratory analysis to determine type abundance, diversity index, dominance and heterogeneity. The results were also compared to initial environmental condition before the project activity. | At 5 points In Lempuing, Macak and Air Sindang Rivers. | Two times per year at operational stage. | Balai Besar Wilayah Sungai Sumatera   | Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well as Environmental Council of OKU and OKU Timur Districts.             | Governor, Environmental Council, Agricultural Council and Health Council of South Sumatra Province as well as Environmental Council of OKU and OKU Timur Districts. |
| 3.  | Job and Business Opportunity | Manpower recruitment and business opportunity.   | Activity as the main impact source was irrigation facility operation. It will increase water supply for rice crops that can increase job opportunity and business opportunity which subsequently | Unemployment and farmer income/welfare level.             | To determine the succeed of implemented environmental management as improvement inputs in the future.                           | It was conducted by field observation, interview and documents study related to manpower recruitment. This data was then analyzed by using descriptive-qualitative method.                    | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts   | One time per year at operational stage.                | Balai Besar Wilayah Sungai Sumatera      | Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKU and OKU Timur Districts. | Governor, Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKU and OKU Timur Districts. |   |

| No. | Environmental Components | The Monitored Important Impact  | Impact Source   | The Monitored Environmental Parameter   | Environmental Monitoring Objective   | Data Collecting and Analysis Method  | Environmental Monitoring Method  |   | Monitoring Period and Frequency            | Operator  | Supervisor  | Reporting |
|-----|--------------------------|---|---|---|--|--|--|---|--|---|---|-----------|
|     |                          |   |   |   |  |  | Environmental Monitoring Location  | Institution of Environmental Monitoring |  |   |   |           |
| 4.  | Local Economy            | 1. Area development and local economy development.<br>2. Give high multiplier effect on local area development and District in general. | Will Increase the economy due to the increase of agricultural production. | Activity that has a role as main impact source was irrigation facilities operation activity. It will increase water supply for rice crops that can increase job opportunity and business opportunity which subsequently will increase the economy due to the increase of agricultural production. | recruitment, especially local manpower.<br>Reducing or minimizing conflict potential between project and manpower as well as local community | It was conducted by field observation, interview and documents study related to manpower recruitment. This data was then analyzed by using descriptive-qualitative method. | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts | Balai Besar Wilayah Sungai Sumatera     | One time per year at operational stage.    | Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. | Governor, Environmental Council, Agricultural Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. |           |
| 5.  | Community Health         | Important impact was community health disorder due to the use of pesticides   | The impact source was the use of pesticides                               | Parameters that will be observed are complains  | Monitoring objective was to determine the secondary data from the  | It was conducted by observation, field observation and interview as well as  | Monitoring locations were villages in the surrounding of   | Balai Besar Wilayah Sungai Sumatera     | Monitoring period was one time per year at | Environmental Council, Health Council and Manpower  | Governor, Environmental Council, Health Council and Manpower  |           |

## BALAI BESAR WILAYAH SUNGAI SUMATERA VII

ENVIRONMENTAL MONITORING PLAN  
Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)

| No. | Environmental Components   | The Monitored Important Impact   | Impact Source  | The Monitored Environmental Parameter  | Environmental Monitoring Objective   | Environmental Monitoring Method  |   | Monitoring Period and Frequency  | Operator   | Supervisor  | Reporting   |
|-----|--|--|--|--|--|--|---|--|--|---|---|
|     |  |  |  |  |  | Data Collecting and Analysis Method  | Environmental Monitoring Location   |  |  |   |   |
| 5.  | river water and well water having poor quality as a result of water pollution. | and herbicides on crop maintenance during operation of irrigation channel. | from community members related to diseases due to water pollution.   | Implementation of disease prevention efforts which cause by decrease in water quality and to determine implementation of preventive efforts for poor environment as a results of channel operation.  | closest Community Health Center. The obtained data was then analyzed by using descriptive qualitative method.  | Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts  | operational stage.  | Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.               | Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. | Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.  | Council and Manpower Council of South Sumatra Province as well as Environment al Council of OKI and OKU Timur Districts.  |
| 6.  | Community Perception   | Positive and negative perceptions toward channel operation                 | The impact source was the use of pesticides and herbicides on crop maintenance during operation of irrigation channel. | 1. Claim numbers and frequencies from community problems in the surrounding activity location which accept or reject specific activities in every project activity series during operational stage.<br>Supporting or rejection level from community toward | To determine the probability of community members rejection toward channel operational activity.<br><br>To prevent community rejection toward this activity plan and to prevent the occurrence of social conflict. | It was conducted by observation, field observation and interview. The obtained data was then analyzed by using descriptive qualitative method. | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts. | One time per year at operational stage or accidentally in case of social problems which need specific treatment. | Balai Besar Wilayah Sungai Sumatera  | Environmental Council, Health Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. | Governor, Environment al Council, Health Council and Manpower Council of South Sumatra Province as well as Environment al Council of OKI and OKU Timur Districts. |

**BALAI BESAR WILAYAH SUNGAI SUMATERA VIII**  
**ENVIRONMENTAL MONITORING PLAN**  
**Environmental Impact Assessment for Irrigation Development at Lempuing Area (13,500 ha)**

| No. | Environmental Components | The Monitored Important Impact                   | Impact Source  | The Monitored Environmental Parameter  | Environmental Monitoring Objective  | Environmental Monitoring Method   |                               |  | Monitoring Period and Frequency         | Operator   | Supervisor   | Reporting |
|-----|--------------------------|--|--|--|---|---|-------------------------------|--|---|--|--|-----------|
|     |                          |  |  |  |   | Data Collecting and Analysis Method   |                               | Environmental Monitoring Location            |   |  |  |           |
| D.  |                          |  |  |  |   |   |                               |  |   |  |  |           |
| 1.  | Air Quality              | Increasing of dust concentration in ambient air. | Mobilization activity of equipments and materials as well as channel ordering activity that cause decreasing of air quality either from pollutants of exhaust gases emission of heavy equipments or from dust during materials transportation and channel ordering activity. | Pollutant gases in air such as NO, SO, CO, NH <sub>3</sub> , H <sub>2</sub> S, dust parameter ( <i>dustfall</i> ), and suspended particulates (total suspended particulate, TSP) according to Regulation of South Sumatra Governor No.17/2005. | Determination of ambient air noise which was subsequently compared to related quality standard that consisted of Government Regulation No. 41/1999 and Regulation of South Sumatra Governor No.17/2005. | Air quality data was collected through monitoring and direct measurement in field. Ambient air samples were taken by using equipments of <i>impinger</i> , <i>high-volumetric air sampler</i> , <i>cannister</i> and <i>particulate sampler</i> . | At working area or road lane. | One time per year at post operational stage. | Balai Besar Wilayah Sungai Sumatera VII | Governor, Environmentai Council, Transportatioin Council and Health Council of South Sumatra Province as well as Environmentai Council of OKI and OKU Timur Districts. | Governor, Environmentai Council, Transportatioin Council and Health Council of South Sumatra Province as well as Environmentai Council of OKI and OKU Timur Districts. |           |

| No. | Environmental Components | The Monitored Important Impact                                   | Impact Source   | The Monitored Environmental Parameter | Environmental Monitoring Objective  | Environmental Monitoring Method   |                                   | Monitoring Period and Frequency              | Institution of Environmental Monitoring |   |  |
|-----|--------------------------|--|---|---------------------------------------|---|---|-----------------------------------|--|---|---|--|
|     |                          |  |   |                                       |   | Data Collecting and Analysis Method   | Environmental Monitoring Location |  | Operator                                | Supervisor  | Reporting  |
| 2.  | Noise and Vibration      | Increase of noise level at the surrounding of activity location. | Mobilization activity of equipments and materials as well as channel ordering activity:an | related to Air Quality Control.       | Determination of noise level which was subsequently compared to related quality standard that consisted of Government Regulation No. 41/1999 and Regulation of South Sumatra Governor No.17/2005. | Noise level data was collected through monitoring and direct measurement in field. Noise level was measured by using <i>sound level/ meter</i> through simple measurement method. | At working area or road lane.     | One time per year at post operational stage. | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council, Transportation Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. | Governor, Environmental Council, Transportati on Council and Health Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. |

| No. | Environmental Components                 | The Monitored Important Impact   | Impact Source  | The Monitored Environmental Parameter   | Environmental Monitoring Objective  | Environmental Monitoring Method  |   | Monitoring Period and Frequency   | Institution of Environmental Monitoring |   |   |
|-----|--|--|--|---|---|--|---|---|---|---|---|
|     |  |  |  |   |   | Data Collecting and Analysis Method  | Environmental Monitoring Location   |   | Operator                                | Supervisor  | Reporting   |
| 3.  | Job Opportunity and Business Opportunity | Manpower recruitment and business opportunity.                         | The main impact source was manpower recruitment activity.            | Procedure appropriateness of job relationship severance with current stated regulation. | Reducing or minimizing conflict potential between project and manpower as well as local community members.  | It was conducted by field observation, Interview and documents study related to manpower recruitment. This data was then analyzed by using descriptive-qualitative method. | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts. | One time per year at post operational stage.  | Balai Besar Wilayah Sungai Sumatera VII | Environmental Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts.                 | Governor, Environment al Council and Manpower Council of South Sumatra Province as well as Environment al Council of OKI and OKU Timur Districts.                 |
| 4.  | Community Perception                     | Positive and negative perceptions toward channel operational activity. | Impact source was channel ordering activity and manpower management. | To determine the probability of community members rejection toward activities.          | Claim numbers and frequencies from community problems in the surrounding activity location which accept or reject specific activities in every project activity series. | It was conducted by observation, field observation and interview. This data was then analyzed by using descriptive-qualitative method.                                     | Monitoring locations were villages in the surrounding of Semendawai Timur, Lempuing and Lempuing Jaya Subdistricts. | One time per year at post operational stage or accidentally in case of social problems which need specific treatment. | Balai Besar Wilayah Sungai Sumatra      | Environmental Council, Health Council and Manpower Council of South Sumatra Province as well as Environmental Council of OKI and OKU Timur Districts. | Governor, Environment al Council, Health Council and Manpower Council of South Sumatra Province as well as Environment al Council of OKI and OKU Timur Districts. |

