

1

6

8



# QUARTERLY NEWSLETTER

Environment, Innovation, and Development of Energy Intensive Industries (E.I.D) MAMBERAMO RIVER PROJECT

ISSN: 1410-5578

### CONTENTS

- □ EDITORIALS
- PREFEASIBILITY STUDY ON RICE AND PALM-OIL PLANTATION IN DOWNSTREAM MAMBERAMO RIVER AREA 2
- ASSESSMENT ON ENVIRONMENTAL IMPACTS IN UPSTREAM MAMBERAMO 3
- REGIONAL DEVELOPMENT PLAN FOR SPATIAL UTILIZATION OF MAMBERAMO RIVER AREA 4
- □ BRIEFS
- □ MIC NEWS

Advisory Board : Prof. Dr. Zuhal Prof. M.T. Zen Prof. Dr. Harijono Djojodihardjo Drs. Agus Salim Dasuki, M.Eng.

Editorial Committee: Meirios Moechtar, Ph.D., P.E.

Agus Sugiyono, M.Eng. Dr. Hari Suharyono

#### **Published by:**

Mamberamo Information Center (MIC) BPPT Building II, 20 Floor Jl. M.H. Thamrin 8, Jakarta 10340 Indonesia Telp. +62-21-316-9783 Fax. +62-21-316-9765

#### Bank:

BAPINDO - Jakarta M.H. Thamrin Branch Jl. M.H. Thamrin 3, Jakarta 10340, Indonesia Account No.: 211.11.0090.1

MAMBERAMO NOW welcomes articles, reviews or advertisement for publication.

All rights reserved by MIC©1998

#### Vol. 2, No. 2, July 1998

### **EDITORIALS**

In Fiscal Year 1997/98, the Mamberamo Study Team of BPPT had conducted some preliminary studies on (1). rice and palm-oil plantations; (2). environmental impacts assessment; (3). regional development plan; (4). regional transportation system; and (5). development and utilization of energy. All studies were performed by BPPT researchers in collaboration with other research institutes and with support from the local government of Irian Jaya.

In this issue, we only presented some excerpts from the first three studies above, due to the space constraints. In the first article, we presented some studies on the potential of rice and palm-oil plantation in the downstream Mamberamo area, while in the second one we assessed the possible environmental impacts of the project development. In the last article we proposed the regional development of the Mamberamo River Catchment Area, which included the industrial, commercial and residential zonations.

Finally, we presented some recent activities in regular section, BRIEF, followed by some related information on MIC NEWS.

Editor-in-Chief Meirios Moechtar, Ph.D., P.E. ♣

## PREFEASIBILITY STUDY ON RICE AND PALM-OIL PLANTATION IN DOWNSTREAM MAMBERAMO RIVER AREA

### Meirios Moechtar, PhD, PE

In the scenario for the Environment, Innovation and Development of Energy Intensive Industries Mamberamo River Project, we proposed 12 preliminaries studies to support the preparation of the Masterplan of the project. One of them is the study on the utilization of Mamberamo potential for food and agro-industry, which its results are excerpted in this article.

The development of this food and agroindustry program is in line with the national program in improving the sustainability and self-sufficiency of food and widening the agroindustry and job opportunities in the new area. The preliminary study results on land suitability. conducted by **BPPT** in collaboration with the Institut Pertanian Bogor (Bogor Agriculture Institute), show that around 1,135,147 hectares is good for the rice plantation, while about 110,126 hectares is for palm-oil plantation. The total area of Mamberamo River Basin is approximately 7,7 million hectares  $(77,000 \text{ km}^2)$ . The large area of suitable and potential lands for those activities, is even supported by high water discharge in the Mamberamo River, which is around  $4,532 \text{ m}^3/\text{s}$  or equivalent to about 2,777 times of total discharge in West Java. While the underground water discharge is about 304  $m^3/s$  or about 2.6 times of the one in West Java. However, if we observe this potential from the spatial scope, the results of this study is still very rough as it was based on the map with resolution of 1:250,000. Therefore, it is mandatory to obtain a more detail and more accurate map of the area, supported by sufficient and reliable information on the land conditions, hydrology and climate for a certain period of time. The following secondary data is used in preparing this report: topographic map, hydro-topographic map, water quality data, developed pattern of planting, climatical and hydrological data.

A rough climatic data is available from several climatological stations in the Mamberamo River area. While the information on land conditions and basic hydrological data are resulted from some studies conducted either by BPPT, the Directorate General of Water Resources, Department of Public Works, and other institutions.

Based on the land suitability and the accessibility of the area, the study suggested that the agriculture development should be commenced from the downstream area of Mamberamo River. It lies in between  $1^{0}35'$  - $2^{0}23'$  South latitude and  $137^{0}5' - 137^{0}49'$  East longitude, and two districts, that is Jayapura and Yapen Waropen. In order to be successful, a more detail and more accurate information on the proposed area is imperative. An interpretation of a map with a scale of 1:50,000 on the land conditions, hydrology and climate can be used as a reference in performing the zonation for the agriculture potentials, especially for rice and palm-oil be successful. plantations. То the interpretation should be backed by some considerations on the expansion of the potential land and accessibility. Additional considerations will cover the general business feasibility in the area, viewed from both economical and technical aspects such that its utilization on the rice and palm-oil plantations will be effective and benefit.

Based on the facts above, this study is aimed to obtain more detail and accurate descriptions on the feasibility of rice and palm-oil plantations and industries in the downstream area of Mamberamo. These activities are in accordance with the national program in fulfilling the food and palm-oil demand for the region, nation or even for export purpose. The resulted prefeasibility study is based on the land suitability assessment using a map with a scale of 1:50,000. This can also be used by the provincial government of Irian Jaya in preparing the policy to manage and develop the agriculture industries in the region, and by the interested investors in establishing such businesses in the area. Some documentation produced during this study are executive summary, final report, digital maps for the

suitability for rice and palm-oil land plantations, and external hard disk which contains of those digital maps. They are available from the Agriculture Study Group of BPPT through the MIC Secretariat at a nominal price to cover the reproduction cost and other related costs. One of the samples of the digital maps, which shows the land suitability for the palm-oil plantation in the downstream Mamberamo River is as shown the Figure 1 below. The shaded areas that surround the Rombabei Lake are the zones which are suitable for the palm-oil plantation. More details on this digital map are available on the project final report for fiscal year 1997/1998.



Figure 1: Digital map of land suitability for palm-oil plantation in downstream Mamberamo River area

In order to show what you may learn from the preliminary study report, the author presented one of many aspects in this agriculture activities. Based on the results of study, for example, both rice and palm-oil plantations may need the following fertilization schemes, which are summarized in Tables 1 and 2.

Based on the land suitability study above, we may conclude that followings: 1). the total

potential area for rice is 103,560 hectares (of more than 1.1 million hectares of potential area) while for palm-oil plantation is around 125,800 hectares; 2). due to the scattered locations of the suitable land for rice, it is not recommended to establish a rice estate, but through a small farming of 10 hectares each; 3). palm-oil estate of the size as large as 29,000 hectares (of more than 130,000 hectares available), can be developed in the southeast part of the downstream area (the rest can be utilized later or for conservation purpose); and 4). more study on the land suitability for local food sources, such as yam and sago, and other commodities.

Table 1: Suggested dosage for rice fertilization

Level of Fertility		
Low	Medium	High
20,000	15,000	10,000
20,000	15,000	-
5,000	2,500	-
7.5	5	-
	Low 20,000 20,000 5,000 7.5	LowMedium20,00015,00020,00015,0005,0002,5007.55

Table 2: Type of fertilizers and suggested dosage for palm-oil seeding schemes

Seed Age (in weeks)	Fertilizers	Dosage (per seed)	Rotation (in weeks)
4 -5	Urea 0.2%	300-400 lt.	1
6-7-	Urea 0.2%	400-500 lt.	1
8-16	R* 15.15.6.4	1 gr.	1
17-20	R* 12.12.17.2	5 gr.	2
21-28	R* 12.12.17.2	8 gr.	2
29-40	R* 12.12.17.2	15 gr.	2
41-48	R* 12.12.17.2	17 gr.	2

\* R = Rustica; Source: BPPT (1997)

In addition, we would like to recommend the followings: 1). due to the geophysical conditions of the area and the lack of supporting infrastructures and utilities, the latter is the prerequisite for the development of this area; 2). land procurement for the rice plantation should be prepared by the government due to their scattered locations; 3). palm-oil estate is recommended to be commenced on the dry land in the south-east part of the region; 4). voluntary transmigration should be encouraged to fulfill the need of workers and farmers in the plantation; 5). in the early stage, the local workers may be assigned in planting and harvesting the oil palm, and simultaneously their skill can be improved gradually; 6). due to the lack of experience of the local people in planting rice, the required workers should be fulfilled through transmigration program, at least at its early stage; and 7). integrated development scenario for the Mamberamo area, which includes the development of industrial estates, will invoke the introduction of modern agricultural methods.

### ÷

### ASSESSMENT ON ENVIRONMENTAL IMPACTS IN UPSTREAM MAMBERAMO

### Agus Sugiyono, MEng.

The purpose of this study is to assess the conditions and dynamics of the Mamberamo River Catchment Area (MRCA) as a life support system and sustainable regional development. The study is still in its reconnaissance stage and utilizes secondary data with some site-visit validation. The main objectives of the study are:

- To collect data on the status and actual conditions of the natural resources and environment in MRCA.
- To identify the region and its environmental components which are sensitive to the alteration and may have impact to the environment.

The location of study is as shown in Figure 2, which covers a total area of about 79,881 km<sup>2</sup>. Mamberamo River is formed from the joining of two big rivers, i.e., Taritatu River which flows from the east side (Jayawijaya Mountain) and Tariku River flows from the west side (Sudirman Mountain). These two rivers merge in Papasena and become Mamberamo River that flows to Northwest through Foja Mountain and emptied into the Pacific Ocean. The river system formation has a shape of branch tree. The upper courses of the river are located in the mountain and lower

course is located in the hill through swampy lowland.



Figure 2. Map of Study Location

In upper course of MRCA, the forest has been classified as:

- lowland rain forest (0 100 m above sea level);
- low mountain-range rain forest (100 1,000 m above sea level);
- mountain-range rain forest (1,000 3,000 m above sea level); and
- freshwater swampy forest.

Low mountain-range rain forest is rich in biodiversity. In general, the type of plant that grows in this area is commercial plant such that it is sometimes converted to be a production forest. There are three companies that have the forest exploitation concession from the Government of Indonesia, that is PT Semey Matoa Timber, PT Wapoga Mutiara Timber II and PT Mamberamo Alas Mandiri.

The results of this study recommend some importance issues that should be considered for future regional development of MRCA. Some of the issues are:

### - Earthquake

The biggest part of the area is a tectonic area that is characterized by many faults.

### - Landslide

The area with high slope that contains doughy and metamorphose stone is predicted to have landslide.

### - Erosion

In the wet tropical area such as in the study area, water is the main cause of

erosion due to high quantity and intensity of rainfall.

- Flood

According to the physiography and land formation, some areas periodically have flood. The location that sensitive to the flood is in the middle part of MRCA along Tariku and Taritatu River.

### - Forest Conservation

Forest conservation is extremely needed for water system purpose. Recently, the government of Indonesia established two conservation area, that is Mamberamo-Foja National Park and Rouffaer River Wildlife Reserve.

÷

# REGIONAL DEVELOPMENT PLAN FOR SPATIAL UTILIZATION OF MAMBERAMO RIVER AREA

### Dr. Hari Suharyono

purpose The of development of the Mamberamo River Catchment Area (RCA) is to minimize the different of social condition caused unbalance development bv achievement. Specifically, the purpose of regional Mamberamo RCA development is to optimize the spatial utilization which is in harmony with the capability of nature to support and also to follow regional and national development policy.

Mamberamo RCA located in Irian Jaya province has a potential to be developed since it has an abundance potential but its utilization is limited. The RCA, which is geographically located in between 1°27' and 4°32' South Latitude and between 136°21' and 140°49' East Longitude, administratively is located in four regencies, i.e., Jayapura, Jayawijaya, Paniai and Yapen-Waropen.

Mamberamo River, the main river system in Mamberamo RCA, is created by two branch rivers, i.e. Tariku and Taritatu rivers. The river has a length of 1300 km and an average width of 250 m. A preliminary study done by PLN indicates that the river has 43 locations of hydro power potential. Out of those locations, Mamberamo (M) 1 and Mamberamo (M) 2 with capacity of 5,695 MW and 933 MW, respectively are the most potential to be developed early.

There are some mineral resource potential in Mamberamo RCA such as oil, radioactive mineral, copper, gold and nickel. However, the exact reserve is not known yet. Extensive exploration is needed to get the reserve.

Mamberamo RCA has a potential to be developed for agriculture, forestry, mining, energy and energy intensive industries. Several part of Mamberamo RCA are infertile because the nutrient layer was washed away by a high rainfall. While Tariku and Taritatu river valley areas, which are up stream part of Mamberamo River, have a high nutrient content. If this area is developed by controlling the float and improve the drainage system, the area will be potential for agriculture, husbandry and fishery activities.

The total area of Mamberamo RCA is 7,944,032 ha. Based on the condition of the land for agriculture purposes, it can be divided into four categories, i.e. good, medium, low and bad areas. The total of the good and the medium areas, which are suitable for agriculture purposes, are 872,520 ha. If 15 % of the area is used for facilities and infrastructures, the total area for agriculture will be 741.642 ha in which 648.937 ha is suitable for plantation and the rest is for housing. About 141,890 ha of the good and the medium areas is good for fishery. The low and the bad areas are 725,765 ha and 6,345,747 ha respectively. These areas are suggested for conservation area only.

Based on BPPT and IPB (Bogor Institute of Agriculture) study in 1996, the break down of the Jayapura, Jayawijaya, Paniai and Yapen-Waropen regencies area, which can be used for various agriculture purposes, can be seen in Table 3.

Based on all potentials available, land conditions and any possible development plans, the use of a particular land can be evaluated and any possible transport mode for the region can be found. The choice of the transport mode in Mamberamo RCA is mainly determined by the physical conditions of the regions. River and road transports are the main choice. The development of transportation route, particularly road system will be followed by electricity and telecommunication transmissions. The locations of M1 and M2 hydropower are assumed to be the center of Mamberamo area. Map of Mamberamo area can be seen in Figure 2. Several infrastructures that should be constructed in Mamberamo RCA are:

- Road and/or river transportation, high voltage alternating current and telecommunication transmissions between M1, M2 and Trimoris.
- Road transportation, high voltage alternating current and telecommunication transmissions between Trimoris and Barapasi.
- Seaport and interconnection station of electricity and telecommunication transmissions at Barapasi.
- Connection between Mamberamo RCA and the northern part of Jayapura region, i.e. road and/or river transportation, high voltage alternating current (air/under water) and telecommunication transmissions that connect Kasonaweja, Trimoris and Mamberamo downstream.
- Road transportation, high voltage alternating current and telecommunication transmissions that connect Mamberamo downstream, Arbais, Sarmi, Bataf, Armopa, Demta, Depapre and Jayapura.
- Connection between Mamberamo RCA and the southern part of Jayapura region, i.e. road and/or river transportation, high voltage alternating current (air/under water) and telecommunication transmissions that connect Kasonaweja, Dabra, Pagai and Navere.

Trans Irian highway, high voltage alternating current and telecommunication transmissions that connects Navere and Jayapura. Port and terminal will be developed at any transfer point of different transport mode. The development of infrastructures will open isolation of the region and will have multiplier effect on socio culture and socio economic. Development stage of Mamberamo RCA, which will take 10 year to finish, can be divided into five activities. The scheme of development stage can be seen in Table 4.

Table 3: Land Use for Various Agriculture Purposes

	Area (ha)				
Land use	Jaya-	Jaya-	Paniai	Yapen	Total
	pura	wijaya		Waropen	
Yard	699964	41529	162991	51951	956435
Wet land	677762	170303	38537	0	886602
(food)					
Wet land	260683	7381	876	0	268940
(food &					
crop)					
Dry land	791472	118455	179287	45932	1135146
crop					
Estate	639711	54050	190152	48896	932809
Sagoo	392806	162922	7822	0	563550
Fishery	884653	196077	110884	33091	1224705
culture					
Limited	52682	19807	10104	9495	92088
production					
forest					
Conservation	1372766	213059	257271	74089	1917185
production					
forest					
Total	5772499	983583	957924	263454	7977460

Source: BPPT and IPB (1996)

Table 4: Time schedule of Mamberamo RCA development



The details of the development scheme are as follows:

1. Development of basic infrastructure in the stage 1. The activities are required to facilitate heavy equipment and construction material from outside Irian Jaya to the dam location. The routes are as follows: outside Irian Jaya to Jayapura (by ship), Jayapura to Wamena (by car for a heavy/big one and by air plane for a light/small one), Wamena to Navere (by car), Navere to Kasonaweja through Pagai and Dabra (by ship/barge), Kasonaweja to the dam location (by ship/barge or by car).

- 2. Development of Karabasi harbor facilities that will be used to support the development of Karabasi area for industrial estate and city center.
- 3. Development of dam and M2 hydroelectric power with a capacity of 933 MW is an option for the first stage. It is estimated that the hydroelectric power will cost US\$ 1.6 billions.
- 4. Development of basic infrastructure stage 2. The activities that include in this stage are to improve and develop infrastructure of road and river transports, high voltage alternating current (air/under water) and telecommunication transmissions from Karabasi to Trimoris, Kasonaweja to Mamberamo downstream through Trimoris and Bagusa.
- 5. Preparation for the location of economic activities center such as development of Karabasi area, of agriculture and fishery activities centers along Mamberamo river, of transmigration center along Mamberamo River and of fishing port and fish canning plant at Mamberamo river down stream area. The area that will be opened in Karabasi (about 20,000 ha).

For the development of infrastructure, i.e. dam, hydropower, harbor and road, the budget required is estimated about US\$ 10 billions. The budget is expected to be obtained from debt and equity either from domestic or foreign sources.

#### ÷

### BRIEFS

### **Ministerial Decree on Mamberamo Project**

Mr. Frans Seda, adviser to H.E. President B.J. Habibie made a courtesy call to the Minister of State for Research and Technology as the Executive Chairman of Eastern Indonesia Development Council (DP-KTI) on June 17, 1998. This meeting was attended by the representatives from BAPPENAS, province of Irian Jaya and private sectors. It was conducted to anticipate the approval of H.E. President Habibie on the establishment of a team to prepare the integrated development of Mamberamo River Basin area, as proposed by Mr. Frans Seda.

After several meetings, a team on the integrated development of Mamberamo Area was finally formed through a Ministerial Decree on July 31, 1997, signed by H.E. Prof. Dr. Zuhal, Minister of State for Research and Technology as the Executive Chairman of the DP-KTI. The main tasks of this team is as follows:

- 1. To prepare the basic concept of integrated development of Mamberamo area;
- 2. To prepare a Presidential Decree on the integrated development of Mamberamo area; and
- 3. To establish cooperation with domestic and international private sectors.

The team is chaired by Prof. Dr. Harijono Djojodihardjo (former Deputy Chairman of BPPT, and currently is the Inspector General for Development) with co-chairmen L.M. Sianipar (entrepreneur), Aunur Rofiq Hadi (DP-KTI) and Dr. K. Erari (private sector). The secretary is Dr. Meirios Moechtar (BPPT) with co-secretary Sugeng Triutomo (DP-KTI). The members of the team are I.G. Toebe (entrepreneur), Prof. Dr. L.A. Manullang (entrepreneur), J.L. Sitanggang (entrepreneur), Dr. Maryudi Sastrowihardjo (National Land Agency) and representative from the provincial development planning board (BAPPEDA Tk. I), Irian Jaya. The members of the advisory board of the team are Frans Seda, Prof. Dr. Herman Haeruman (BAPPENAS) and Prof. M.T. Zen (BPPT).

Besides of this team, there is also a team which was formed on June 5, 1997 through the Ministerial Decree signed by H.E. Prof. B.J. Habibie (the former State Minister for Research and Technology). This team is formed to coordinate the execution of some prefeasibility studies in order to support the development of the Mamberamo River Basin Area. All members of this team are the researchers from BPPT with the support of experts from governmental and private sectors. The main tasks of this team are as follows:

- 1. To prepare a "bankable document" based on the results of the studies;
- 2. To identify the prospective investors; and
- 3. To establish some Working Groups to execute the development activities.

Therefore, this team will deal mostly with the technical, social, economic, environment, and cultural aspects of the project, while the previously mentioned will mainly deal with the legal and financial aspects of the project. We can clearly see that these two teams should work synergically in order to obtain optimum results. In doing so, the realization of the integrated, large and complex development of Mamberamo River Basin area can be conducted effectively and efficiently for the benefits of the people in the area, Irian Jaya and the rest of Indonesia. More details on the preliminary study team were presented in the previous newsletter, Vol. 1, No. 2, July 1997.

### ÷

### MIC NEWS

### **Renewal of MIC Membership**

Times goes by and MIC is already in the second half of its second year of publication. To sustain the continuity of this newsletter, we do hope that our subscribers would support us by renewing their memberships. The due will cover your subscription from September 1998 (vol. 2, no. 3) to July 1999 (vol. 3, no.2).

We also would like to inform you about some adjustments in the membership due. First, we have to increase the membership due. We have no choice and do apologize for this inconvenience; but we have to do so to cover the sky-rocketing increases in all costs. For example, the shipping/handling cost in increased by a factor of 10 (ten), that is from Rp. 6000 to Rp. 55,000. Therefore, we do appreciate your kind understanding on this matter. Second, we are very sorry to inform you that we have to make the membership due based on the geographical location. We have to differentiate the dues between domestic and international memberships. However, there is something that still remain the same, that is you may send your due to the same address:

### **Mamberamo Information Center**

Account no.: 211.11.0090.1 BAPINDO – Jakarta Thamrin Branch Jl. M.H. Thamrin 3 Jakarta 10340, Indonesia Amount due: Domestic Rp. 250,000 International Rp. 350,000

Once again, we thank you so much for your kind understanding and support.

### **Advertisement**

Besides of our subscribers' membership dues, the continuity of this publication depends on the advertizement. This is due to the fact that there is no budget of the government of Indonesia involved in this activity.

Therefore, at this occasion, we would like to encourage our subscribers to introduce their companies to the world-wide recipients of this newsletter. By advertizing your companies in this newsletter, you should be able to let the others know about your interest and concerned in the project, and surely your excellent and commitment as well. Below are the rates for the advertizement:

Color: (≥ 3 colors) a. Full-page b. Half-page	Rp. 3.000.000 Rp. 2.600.000
Color: (≤ 2 colors) a. Full-page b. Half-page	Rp. 2.300.000 Rp. 2.000.000
Black and White: a. Full-page d. Half-page	Rp. 1.500.000 Rp. 1.000.000

÷