





## 1) Background, targeted issues and objectives

Annual flood is occurred during rainy season and nowadays also during drought season, due to Indonesia lay on the monsoon climate zone. Regarding to that, information system is required to inventory and process data about flood occurrence as information for decision-maker to take the right action in managing the flood.

Indonesia has tried to implement GIS to build database, process data and flood information, in order to give priority in handling the problems that occurred from the flood.

One of the objectives that can be gained from the GIS implementation is the information types and communication system that can be used by the related Institutes to collect and communicate the flood occurrence to the regional concern

With the existing of database system about flood data and information, collecting from all Indonesia area, the decision-maker can make the priority of managing flood in Indonesia. The priorities are made mainly to allocate financial and empower equipment and human resources.

### *basin characteristics*

Mamberamo river basin with the area of 78.992 km<sup>2</sup>, located at North Province of Papua, is no doubt a very rich natural resources with high potential to be developed into main economic generator in this particular province, as well Indonesia in general. This river basin located between 136' 21" through 140'49" East Longitude and 1'27" through 4'32" South Longitude, as can be seen in figure 2. And this river basin also is the second largest river basin ranked after Musi River in Sumatera, nearly half wide of Java Island.

### *climate Regime*

Annual rainfall on this area range from 3500 to 5000 mm, which made this area gifted with invaluable, abundant, natural resources energy, as long the rain still keep on falling. Topographical conditon of Mamberamo River Basin most of upstream and middle part dominated by tropical forest mountain, while it's downstream is dominated by swamped lowland. Mamberamo River Basin water resources is hasn't yet well developed. Average annual rainfall occurred between 1.877 mm (Waris Sta.) to 5.605 mm (Apalapsili Sta. in Jayawijaya's mountain). Average temperature on the seashore range between 26<sup>o</sup>C to 27<sup>o</sup>C, while on the mountain its decline 0.5<sup>o</sup>C in average for each 100 m height above msl. The length of sunshine duration from 8.00 am to 4.00 p.m, according data from Climatological Station of Moker, Biak and Wamena. The humidity varied from 77% to 90% (Sentani Sta.)



### *topographical feature*

Mamberamo river is a joint river from two tributaries; Rouffaer River which take its upstream from south side and Idenburg River which take its upstream to East Side up to Papua New Guinea. The longest river length is around 932,8 km from its upstream height at around 5,000 m above msl. Mamberamo River Basin consist of 3 Sub Catchment ; namely Idenburg, Rouffaer and Mamberamo Downstream catchments and flows into Pacific Ocean. Its east side is part of Papua New Guinea; therefore this river is categorized into what so called trans-boundary river basin. The length of Mamberamo River Basin main's river is 1.020 km<sup>2</sup> if one measured it from the Sabuaer catchment which originated from Jayawijaya Mountain from  $\pm$  5.030 m above msl to Pacific Ocean. (See Fig.2 )

### *dominant land use and soil type,*

Most of upstream and middle part of Mamberamo River Basin dominated by mountain topographic with tropical forest, while it's downstream is dominated by swamped lowland. Utilitation of water resources of this river is hasn't yet well developed.

### *socio-economic information*

Based on PT. PLN and Nippon Koei Co.(1983 it is reported that rate of river discharge reach 5500 m<sup>3</sup> per second, which able to produce 20.000 Megawatt electricity energies if one unite all of this magnificent potential together. Mamberamo river is one of river that produce crocodile farm, which its trade centre is directed to Jayapura. Crocodile farm itself can be found in three area ; Jayapura, Sorong and Merauke, which made one of main export commodity of Indonesian Government.

## 2) Observation system

The Hydrological data availability of Mamberamo River Basin is very limited, currently only supported by few climate and rain fall stations around outside of river basin. Climatological station is available in Jayapura the capital city of Papua province. There is fifteen Rainfall station in Jayapura Regency and seven in Jayawijaya. Required gauging stations instalation and streamflow measurement.

## 3) Models, GIS, Data Integration System, Prediction System

This project demonstration will applied Hydrological Models conducted the rainfall and run-off relationship such as Digital Elevation Model ( DEM ), focusing the used of parameters by integrating basin characteristics with climate condition. This model will describe the correlation between climate prediction and flow forecasting, especially for flood event condition. Topographic map and rainfall data is now available on the GIS.

## 4) Schedule

1<sup>st</sup> year, Setting up Models and data integration systems.

2<sup>nd</sup> year, Capacity Building.

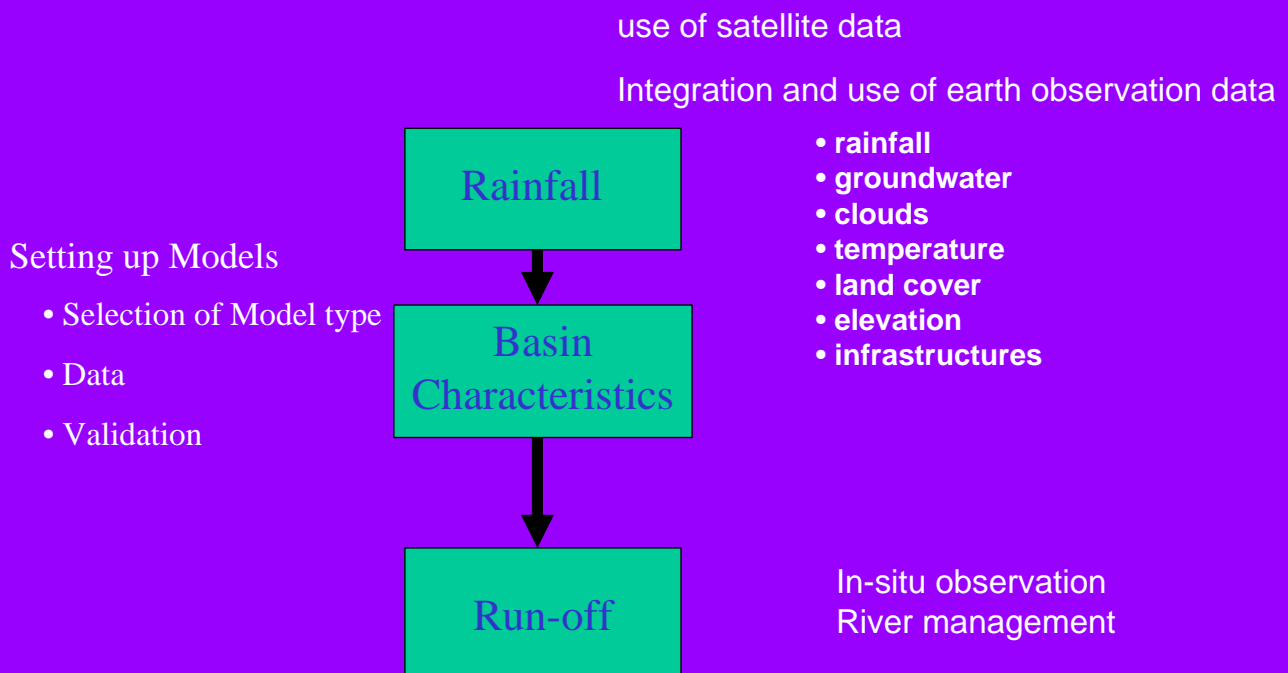
3<sup>rd</sup> year, Models Application.

## Data Integration

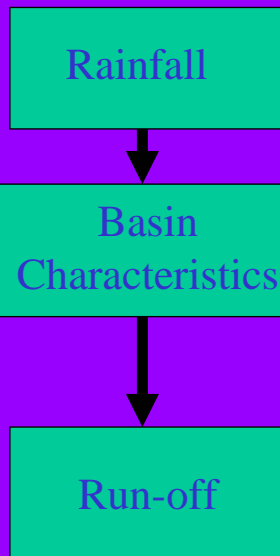
No	Nama Data	Jenis Data	Instansi	Keterangan
1	DEM	Peta ; Skala 1:25000	Bakosurtanal	
2	Breakline	Peta; Skala 1:25000	Bakosurtanal	
3	Landuse (Lama, existing, rencana)	Peta;Skala 1:25000	Pemda Kab.Semarang	
4	Soil / Tanah	Peta; Skala 1:25000	Pemda	
5	Hidrogeologi	Peta;Skala 1:25000	Hidrogeologi/Dep. Tambang	
6	Jaringan Jalan dan Kota-kota (Kec., Kab. Dan Prop.)	Peta; Skala 1:25000	Bakosurtanal	
7	Batas Administrasi (Kec., Kab., Prop.)	Peta; Skala 1:25000	Bakosurtanal	
8	Jaringan Sungai	Peta; Skla 1:25000	Bakosurtanal	
9	Waduk, Danau, Bendung dan tampungan lainnya	Peta;Skala 1:25000	Bakosurtanal/PDSA	
10	Genangan Banjir	Peta; Skala 1:25000	PDSA	
11	Titik Pompaan Air Tanah	Peta; Skala 1:25000	P2AT/PDAM/Pemda	
12	Hujan, Debit, Iklim	Peta & Angka	BMG, PDSA, PLN, dll	
13	Demografi (Umur, Jenis Kelamin, Tingkat Pendapatan dll.)	Peta & Angka	Pemda	
14	Aktivitas Ekonomi (Industri, Hotel, dll)	Peta & Angka	Dinas Industri	

## Hydrological Model

### Rainfall-Runoff Relation



## Prediction System



### Rainfall Estimation

- From satellite data
- From numerical simulation and in situ observations

Use space information for real time flood forecast.

- Incorporating dynamic information for correction or improvement, state of infrastructure, to improve predictions.

Flood Forecast

**Thank you**

**for your kind attention**