Country Report

Implementation of Demonstration Project

Mamberamo River Basin

INDONESIA

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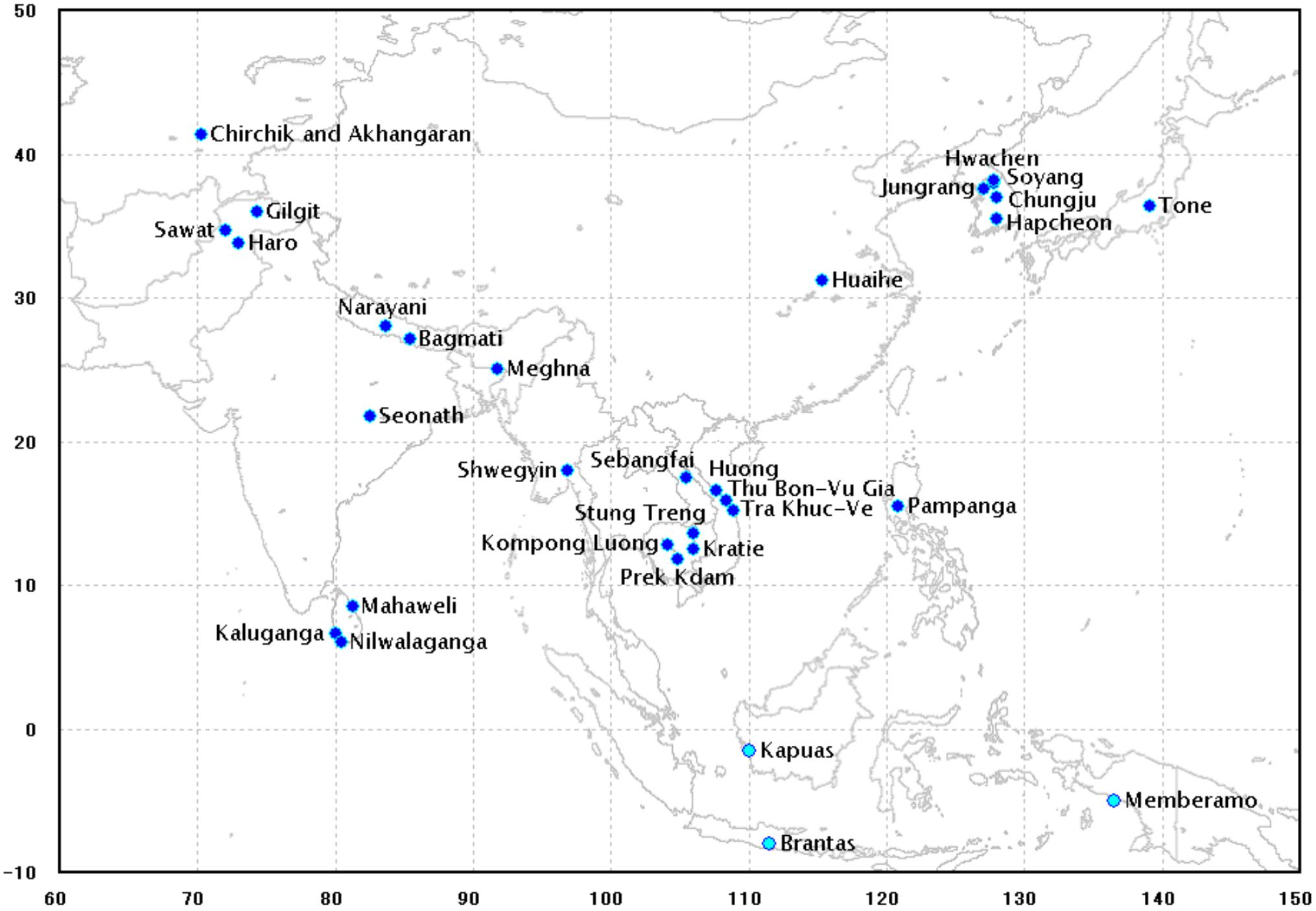
Chirchik and Akhangaran
Gilgit
Sawat
Haro
Narayani
Bagmati
Meghna
Seonath
Shwegyin
Sebangfai
Huong
Thu Bon-Vu Gia
Tra Khuc-Ve
Pampanga
Stung Treng
Kompong Luong
Kratie
Prek Kdam
Mahaweli
Kaluganga
Nilwalaganga
Kapuas
Brantas
Memberamo
Huaihe
Hwachen
Soyang
Jungrang
Chungju
Hapcheon
Tone
50
40
30
20
10
0
-10
60
70
80
90
100
110
120
130
140
150


Mamberamo River
PACIFIC OCEAN
IRIAN JAYA
Javapura
PAPUA NEW GUINEA
Fakfak
Kaimana
CERAM
Kamrau
Modowi
INDONESIA
NEW
Puncak Jaya 5030 m (16,503 ft)
GUINEA
Keawkwa
MALUKU
Banda Sea
KEPLAUAN
MALUKU
Arafura Sea
2°
4°
6°
132°
138°
140°
Fly
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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^2, 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^{0}C to 27^{0}C, while on the mountain its decline 0.5^{0}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 tributries; 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^2 if one measured it from the Sabuaer catchment which originated from Jayawijaya Mountain from ± 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^3 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 correlationship 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

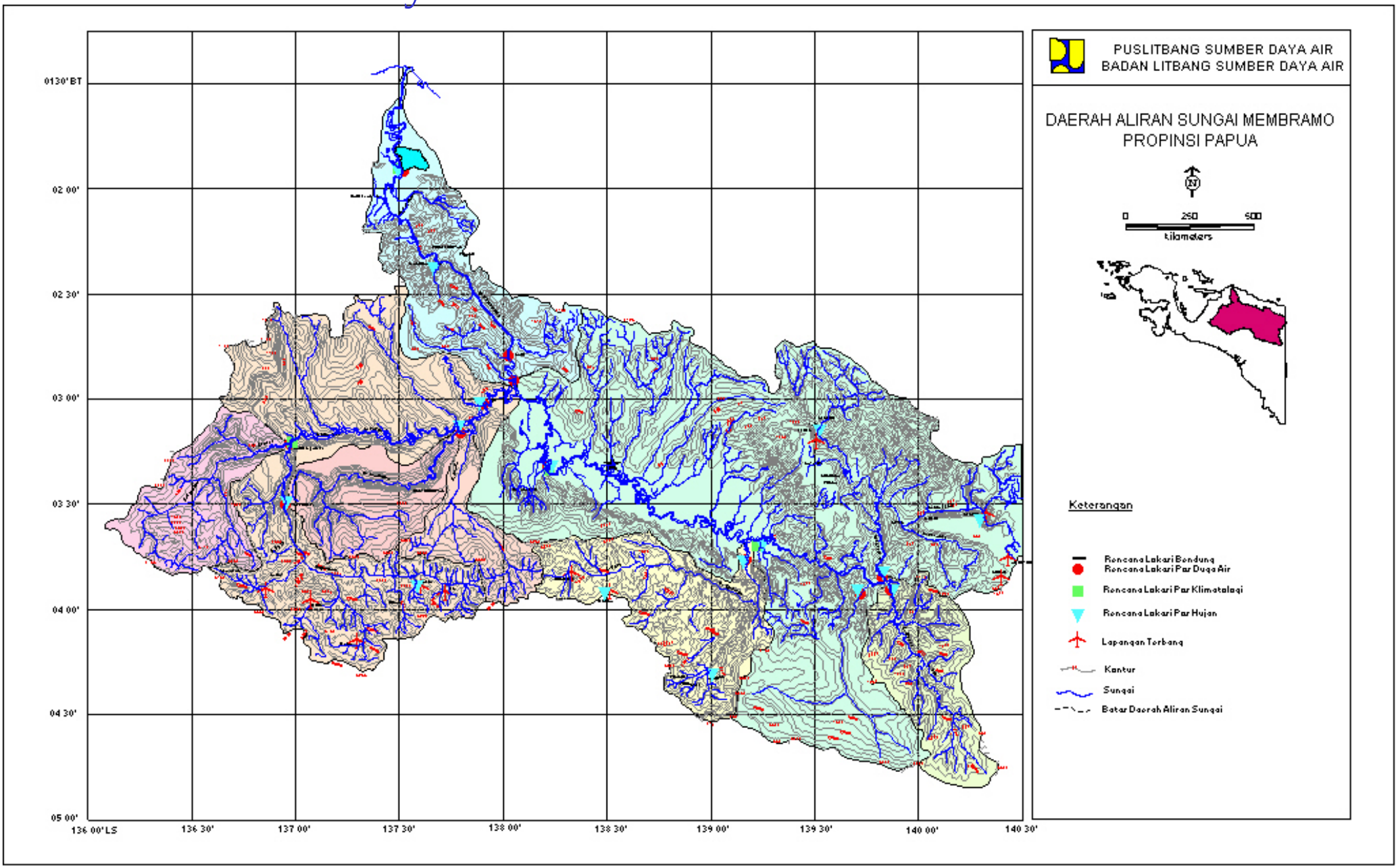
1st year, Setting up Models and data integration systems.

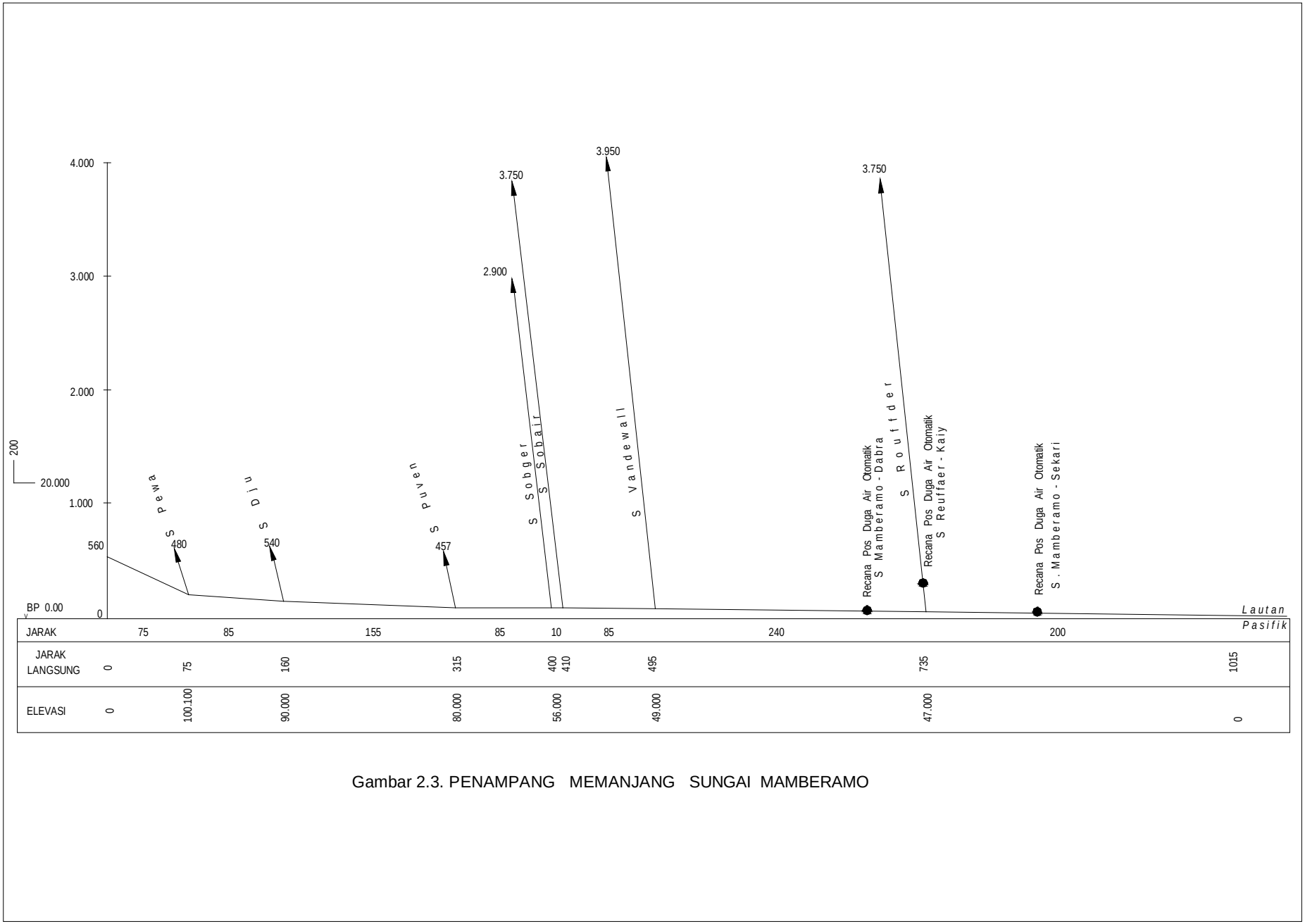
2nd year, Capacity Building.

3rd year, Models Application.

Survey and Data Collection

Survey and Data Collection





Gambar 2.3. PENAMPANG MEMANJANG SUNGAI MAMBERAMO

TEBING SUNGAI SEPANJANG SUNGAI TARITATU DAN TARIKU

KONDISI BULAN JUNI 2003

Transportation

Climatological Station

No	Lokasi	Elevasi m	Koordinat	Temp. ^{0}C	Rh %	Sun %	Wind m/det	Evapo mm/hr
1	Jayapura / Dok II	4	140.43.E 2.52 S	27.3	81	57	1.96	4.7
2	Sentani	98	140.44 E 2.30 S	26.5	78	59	1.89	4.9
3	Sarmi	3	137.51 E 1.50 S	26.7	90	47	1.54	3.9
4	Nabire	10	135,30 E 3.22 S	26.8	79	60	1.71	4.9
5	Wamena	1.660	136.58 E 4 40 S	19.3	79	59	3.02	4.5

Rainfall Data

No.	Lokasi	Jan	Feb	Mar	Apr	Mei	Jun	Jul	Aug	Sep	Okt	No	Des	Thn
1	Jayapura/Dok II	290	262	332	243	167	172	119	136	143	157	167	233	2420
2	Sentani - 4418	207	193	217	180	113	96	107	94	96	120	141	206	1768
3	Sarmi - 2605	210	199	223	188	174	164	171	162	186	155	132	157	2121
4	Nabire - 5202	408	397	425	371	304	268	254	306	308	308	237	333	3919
5	Wamena - 7008	256	272	283	258	217	182	150	170	163	188	166	237	2542

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 Pepompaan 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	

Set Up
Hydrological Model

Rainfall-Runoff Relation

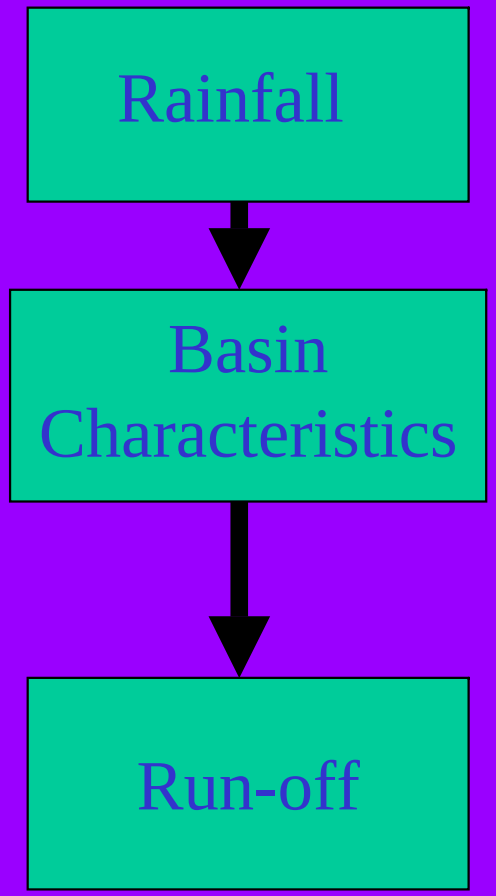
use of satellite data

Integration and use of earth observation data

- **rainfall**
- **groundwater**
- **clouds**
- **temperature**
- **land cover**
- **elevation**
- **infrastructures**

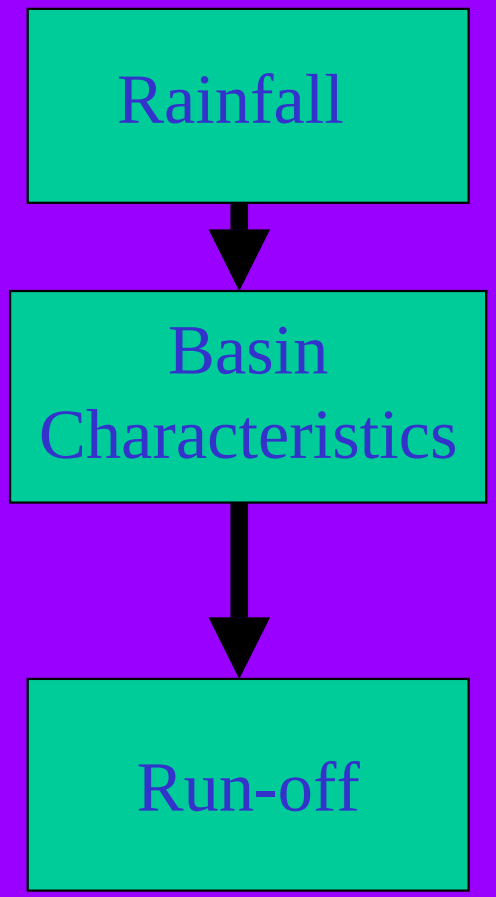
Setting up Models

- Selection of Model type
- Data
- Validation



In-situ observation
River management

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

Program 2008

Establishment National Team consist members from:

- Department
- Research Institute
- University
- Stakeholders

Organize International Workshop with the Goals:

Toward convergence of observation and capacity building for promoting the Integrated Water Resources Management (IWRM) approach through application of integrated earth observation data, model output, downscaling techniques to address local water resources management issues in a river basin.

International Workshop
on
Use Satellite Information in Flood Risk Management

Bandung, Indonesia, … July 2008

Collaboration between:

Global Earth Observations System of Systems/Asian Water Cycle Initiatives

(GEOSS/AWCI)

and

Indonesian Hydrological Society

(IHS)

Supported by:

University of Tokyo (UT)

Japanese Aerospace Exploration Agency (JAXA)

United Nations University (UNU)

International Centre for Water Hazard and Risk Management (ICHARM)

Asian Institute of Technology (AIT)

Research Institute for Water Resources (RIWR)

Agency for the Assessment and Application of Technology (BPPT)

Indonesian National Institute of Aeronautics and Space (LAPAN)

Meteorology and Geophysical Agency (BMG)

Indonesian Institute for Sciences (LIPI)

Program

Monday : Arrival and Registration

Tuesday : 08.00 – 09.30 Registration

09.30 - 10.00 Opening

10.00 - 12.00 Session (Expert Presentations)

12.00 – 14.00 Lunch Break

14.00 - 17.00 Session (Expert Presentation)

Wednesday : 08.00 – 12.00 Session - Rainfall Downscaling

12.00 - 14.00 Lunch Break

14.00 - 17.00 Session - Data Base Management

Thursday : Field Trip

Friday : 08.00 – 11.30 Session – Hydrologic Modeling

11.30 - 13.30 Lunch Break

13.30 – 16.30 Session - Hydrologic Modeling

16.30 - 17.00 Closing

Saturday: Departure

Participants:
18 Member Countries (ITT)
Bangladesh/Bhutan/Cambodia/China/India/Japan/Korea/Laos/Malaysia/Mongolia/
Myanmar/Nepal/Pakistan/Philippines/SriLanka/Thailand/ Uzbekistan/Vietnam

8 Indonesian Engineers (NTT)
RIWR/BPPT/LAPAN/LIPI/BMG/ITB/Department/Stakeholders

Fund:
Supervisor, Experts and Foreign Participants support by GEOSS/AWCI
Local Expenses by Indonesia.

Thank you

for your kind attention