Climate Change Adaptation,

Indonesia Technology Needs And Implementation Plan

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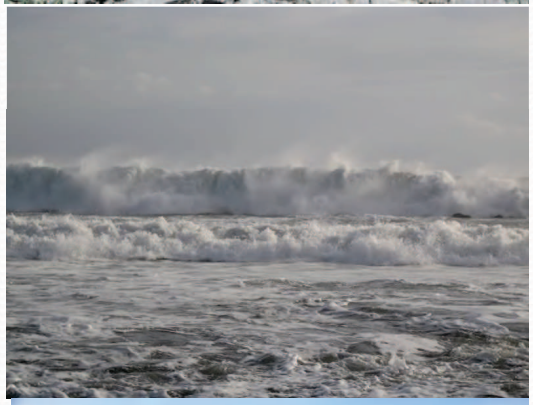
Indonesia Archipelagic State: Vulnerable Area

- Tropical region
- Location between:
  - Pacific Ocean and Indian Ocean
  - Asia and Australia.
- Consist of 17,504 islands, about 6,000 are inhabited.
- The sea area is four times greater than its land area.

- Characterized by strong seasonal variations in the upper oceanic circulation influenced by monsoonal winds.
- Forest land coverage about 120.3 million hectares.

Source : Indonesia TNA, 2008

Climate Change Impact to Indonesia



- Sea level Rise: 115 islands will disappear in 2100
- Change of Ecosystem: loss biodiversity
- Appearance New Diseases
- Extreme Climate
- Change water Rainfall pattern
  - Shorter rainfall days, high intensity in wet season caused flood, water run-off, landslide
  - Longer dry season caused draught,

Priority of Climate Change Adaptation Technologies

Area and Sectors:

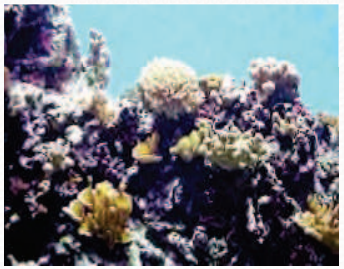
- Food Security
- Ocean and Coastal Vulnerability
- Water Resources

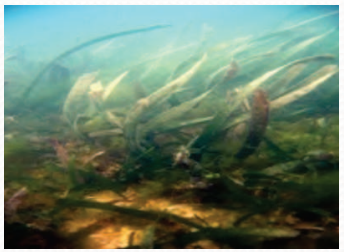
Technology Needs for Food Security

- Crops (Rice) Varieties tolerance to Drought and flood
- Cropping Calendar & Pattern
- Climate Prediction and Modeling
- Cattle Meat Technology
- Technology for marine Culture
- Intermittent Irrigation for Rice Field
- Technology of production, storage and distribution of seeds and seedlings
- Field Climate School for training the farmer
- Development of decision support system for dissemination of appropriate technologies
- Technology of conservation and optimation

Technology Needs for Ocean and Coastal

- Ocean Observing System & Modeling (Sea Level Rise Modeling)
- Seawall and revetment technology
- Beach reclamation technology
- Groyne technology
- Coastal restoration
- Coral Reef Rehabilitation
- Floodwalls system technology
- Marine Fisheries: pattern change





Technology Needs for Water Resources

- Modeling for water resources
- Rain water harvesting
- Water recycle technology
- Polder and pumping technology
- Monitoring and early warning system
- Artificial wetland
- Eco-hydrology for river
- Ground water injection technology

Technology Action Plan

Project ideas

Project I: Dissemination of drought and flood tolerance rice varieties

Project description

- Dissemination of the varieties of rice tolerance to drought and flood to the farmers throughout Indonesia.
- These varieties has been developed by Agriculture Technology Development Center
- Implemented according to the cropping calendar

Project I: Dissemination of drought and flood tolerance rice varieties

- Step of Activities:
- Year I: Training of trainer (ToT) to the Local/provincial of Agriculture Center on:
  - Development the Cropping Calendar
  - Production of the rice seed that tolerance to drought and flood
  - Pilot project in the area of 200 ha
- Year II: Implementation
  - Implementation in 6,000 ha
  - Assist by the Trainers
- Year III:
  - Implementation by the farmers
  - Technical assistance by the trainer

Project I: Dissemination of drought and flood tolerance rice varieties

Project Cost:

- Year I: US$ 200,000
  - US$ 100,000 for ToT to 200 trainers
  - US$ 100,000 for seed production and pilot project
  - US$ 50,000 for technical assistance to the farmers
- Year II: US$ 2.9 M
  - US$ 2.4 M for Implementation in 6,000 ha
  - US$ 500,000 for technical assistance to the farmers by the Trainers
- Year III: US$ 900,000
  - US$ 400,000 for socialization to the farmers throughout Indonesia
  - US$ 500,000 for technical assistance
- **TOTAL PROJECT COST FOR 3 YEARS: US$ 4.0 M**

Project II: Water Resources Modelling for Citarum Watershed

Project description

- Citarum watershed is the largest and longest river basin in west Java-Indonesia (718,268.53 Ha, 269 km main river and 14,346 km including tributaries)
  - 12 sub-watershed and 3 great Basin/ Dam (Saguling, Cirata, Jatiluhur)
  - Source of irrigation of 300,000 ha agriculture irrigation water
  - Sources of drinking water for the city of Bandung, Cimahi, Cianjur, Purwakarta, Jakarta.
  - Sedimentation rate 25.52 tons/ha/year
- Replicable for other watershed in Indonesia

Project II: Water Resources Modelling for Citarum Watershed

Objective:

- Modeling and projection of Citarum watershed water resources up to the year of 2100
- Establish strategic planning of Citarum watershed up to year 2010 to adapt the impact of climate change
- Establish the pilot project
- Implementation the strategic planning

Methodology:

- Using the Geographic Information System (GIS)
- Selected the best soft wear
- Alternative soft wear: Modflow, Powersim, ArcView GIS, FJ. Mock, NRECA

Project II: Water Resources Modelling for Citarum Watershed

Step of Activities:

- Year I:
  - Collect secondary data
  - Survey of rainfall, hydrogeology, water quantity & quality, social economy
  - Establish expert networking
- Year II:
  - Modeling and projection until year 2100
  - Establish Strategic planning of water management in Citarum watershed for scenario 2015, 2050 and 2100
- Year III:
  - Dissemination
  - Pilot project for water management
- Year IV
  - Implementation the strategic planning

Project II: Water Resources Modelling for Citarum Watershed

Project Cost:

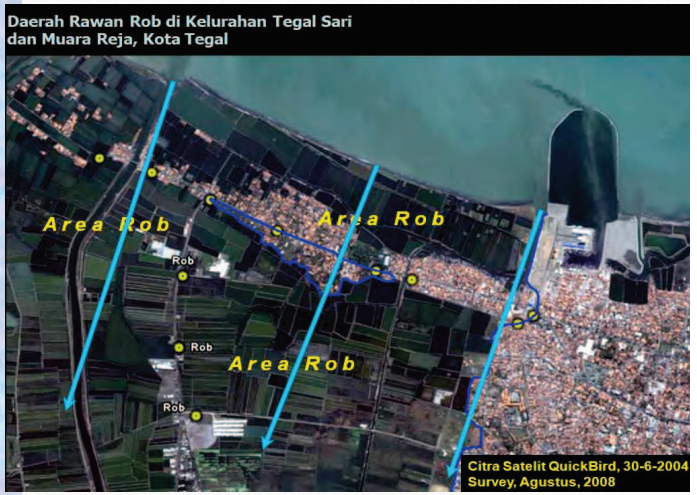
- Year I: US$ 100,000
- Year II: US$ 800,000
- Year III: US$ 500,000
- Year IV: Depend on the projects implemented

TOTAL COST FOR 3 YEARS: US$1.4 M

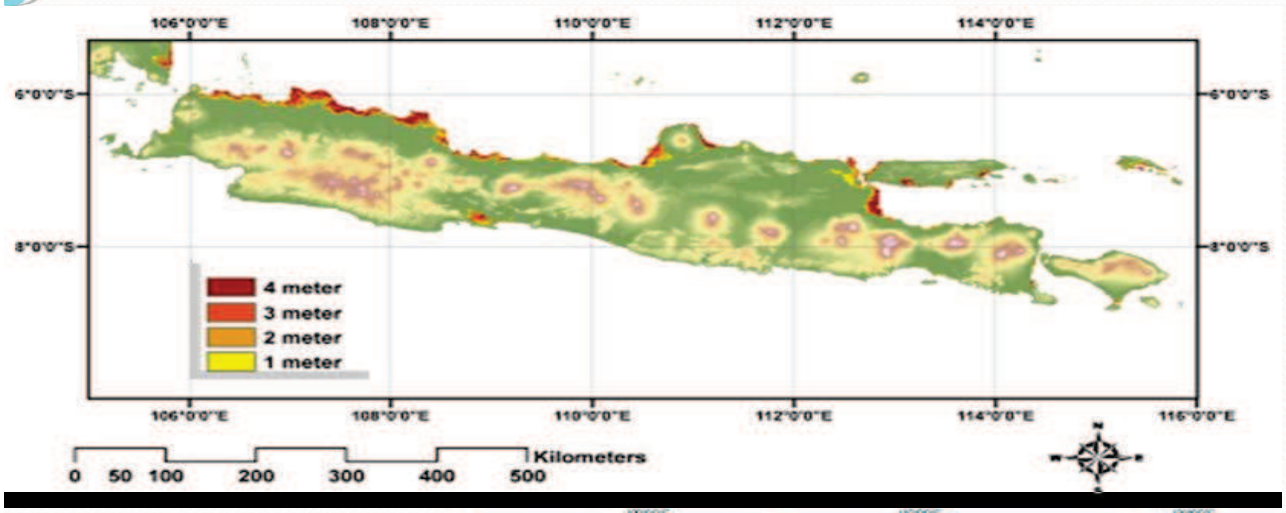
Project III: Coastal Protection and Reclamation

Project description:

- Most of big cities in Indonesia are located in coastal area
- Rising of sea level may result inundation in coastal area in Indonesia
- The highest vulnerable are in some parts of Java's north coast, southern cost of central Java and bali
- Priority location in Tegal and Pemalang
- Replicable for other location

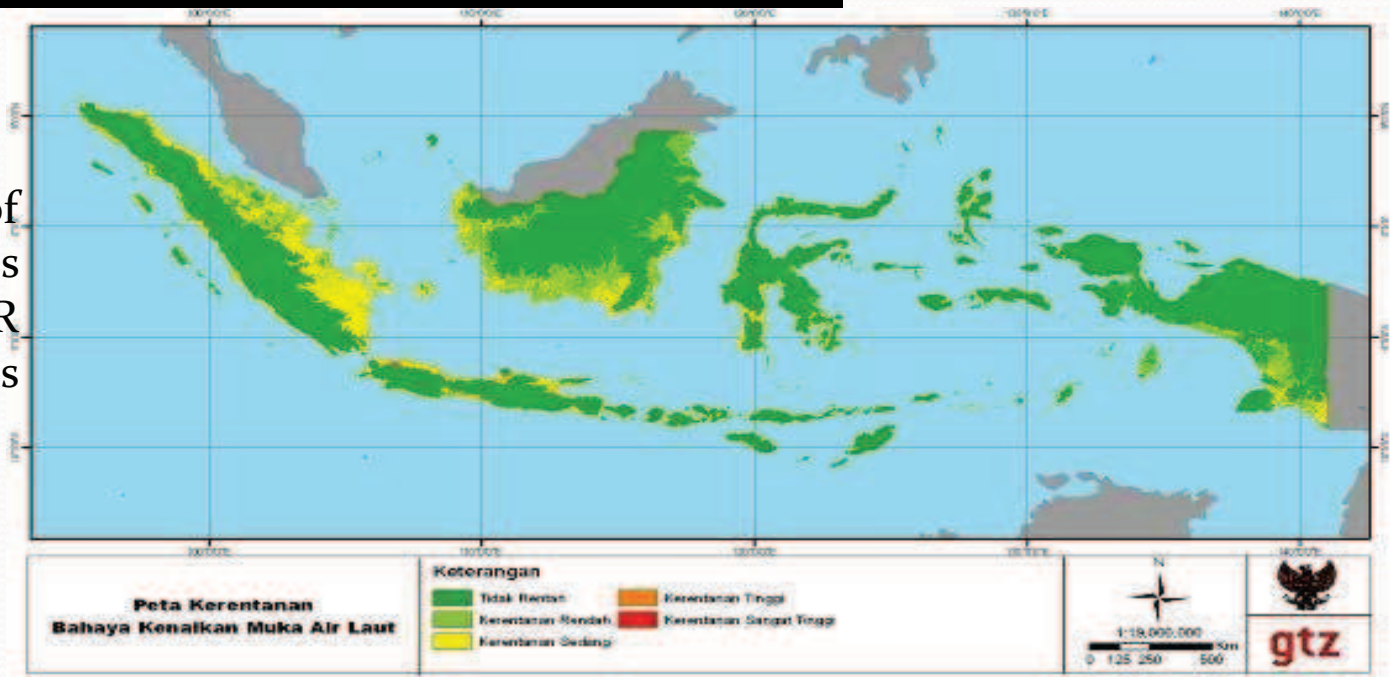


Project III: Coastal Protection and Reclamation



Simulation of coastal inundation in Java-Madura-Bali (ICCSR, 2009)

Vulnerability maps of sea level-rise hazards in Indonesia (ICCSR marine and fisheries sector, 2010)



Project III: Coastal Protection and Reclamation

Step of activities:

First year:

- Vulnerability assessment
- Assess the suitable technology

Second year

- Funding and economic analysis
- Establish Master plan and Feasibility Study
- Detail Engineering design

Third year

- Construction
- Monitoring

Project III: Coastal Protection and Reclamation

Project Cost (estimate):

First year:

- US$ 1.0 M

Second year

- US$ 3.0 M

Third year

- 1.5 – 7.0 M/ km for seawall and revetment

Thank you