

APPENDIX IX:

PRESENTATION FROM SURVEY TEAM

**1) Presentation during 1st Workshop (May 17th,
2010)**



Preparation Selection Urgent Flood Mitigation Works in the Upper Citarum Basin, Bandung, May 17, 2010

JICA Urgent Flood Control Project STAGE (I) & (II) (1988 – 2007)

Strategy, Implementation, what are the results, the lessons learnt and the way forward

Kenichiro KATO, P.E., Jp (C.E.) | M.Sc. | M.Eng.

Team Leader

**JICA Preparatory Survey for Upper Citarum Basin
Tributaries Flood Management Project**



Flood Disasters in the Upper Citarum Basin



Jan. 1984 Floods (Flooding around Dayeuh Kolot)



Jan. 1988 Floods (Flooding of Cisangkuy River near confluence of the Citarum River)

Source: JICA Study on the Flood Control Plan of the Upper Citarum Basin (1988)

Sheet 1



Flood Disasters in the Upper Citarum Basin

Jan. 1988 Floods

(Flooding of low-lying areas along left bank of the Citarum River at upstream of Dayeuh Kolot)

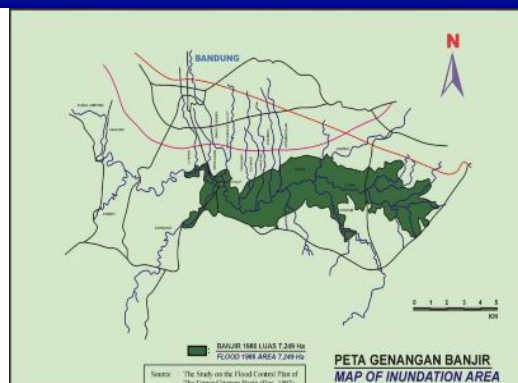


Source: JICA Study on the Flood Control Plan of the Upper Citarum Basin (1988)

Sheet 2



Flood Disasters in the Upper Citarum Basin



Source: The Study on the Flood Control Plan of the Upper Citarum Basin (1988)

Sheet 3



Mar. 1986 Flood

- **Flood Area: 7,249 ha**
- **Flood Depth: 0.8m to 1.5m at Dayeuh Kolot**
- **Damages**
 - 27,310 houses
 - 480 industrial and commercial buildings
 - 124km road in Province and Kabupaten
 - 6,360 ha damage to rice crop
 - Evacuation of 4,300 families
 - Total flood damage is estimated to reach 17,508 million (at 1987 prices)

Source: JICA Study on the Flood Control Plan of the Upper Citarum Basin (1988)

Sheet 4



Flood Disasters in the Upper Citarum Basin



Flood in Dayeuh Kolot (Jan. 25, 2004)



Flood in Dayeuh Kolot (Apr. 1, 2005)

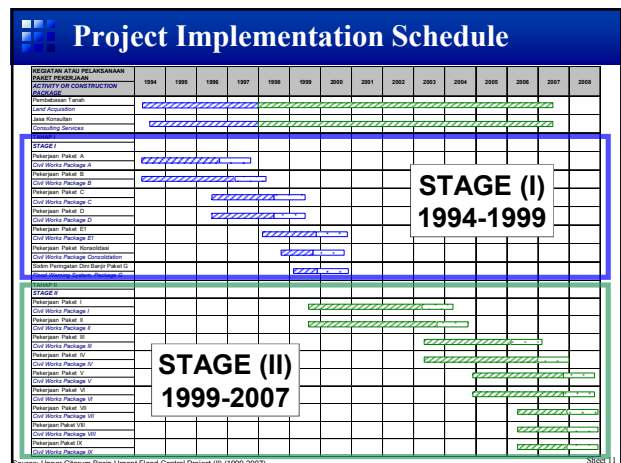
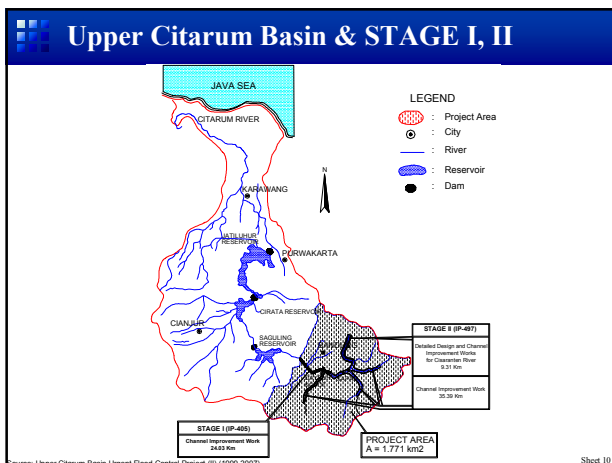
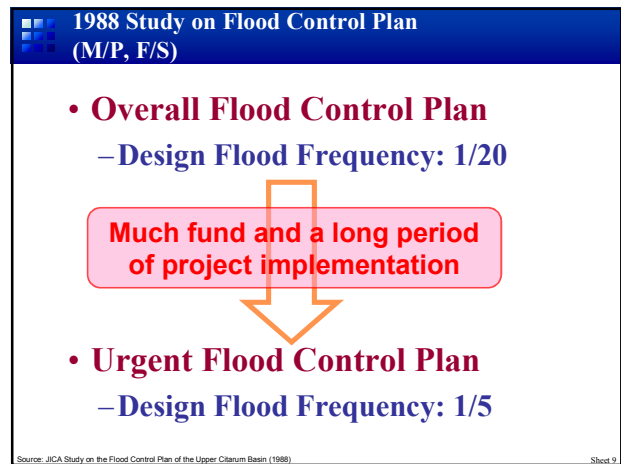
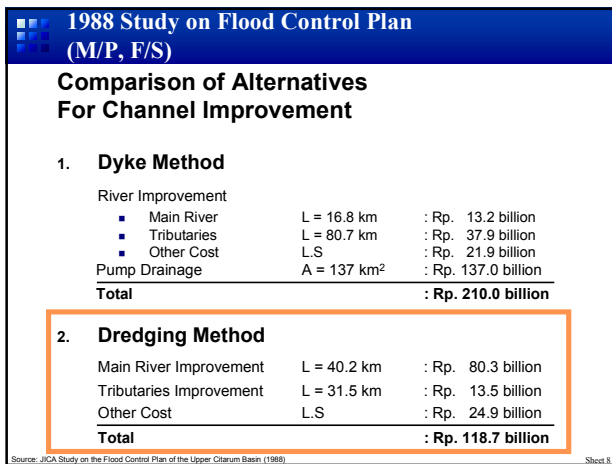
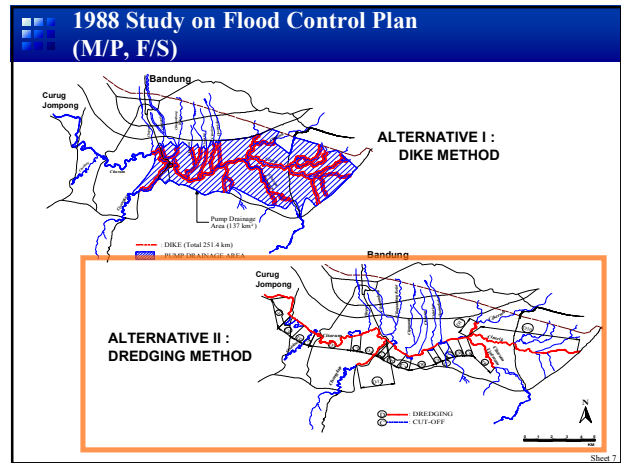
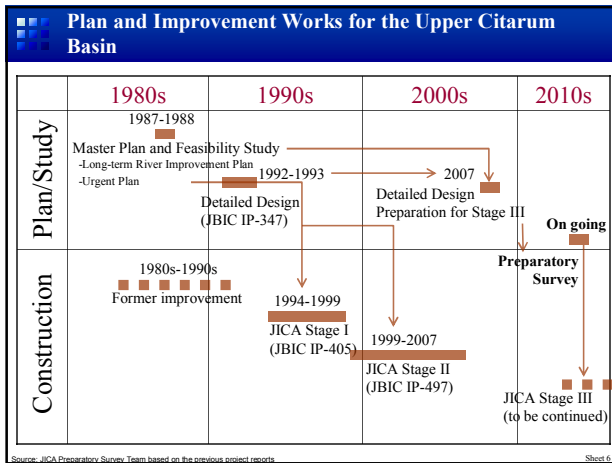


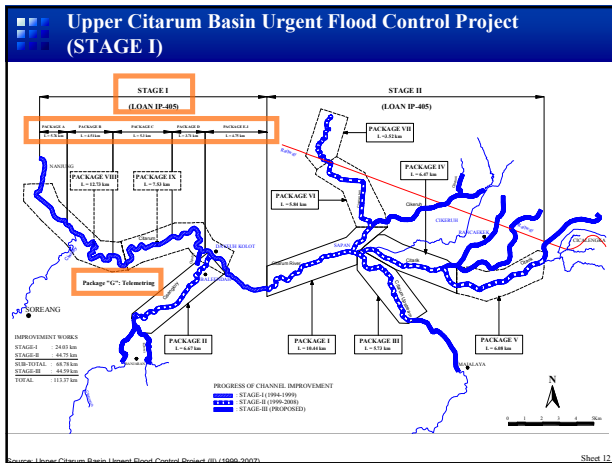
Flood in Dayeuh Kolot (Feb. 22, 2005)



Source: Upper Citarum Basin Urgent Flood Control Project (II) (1999-2007)

Sheet 5



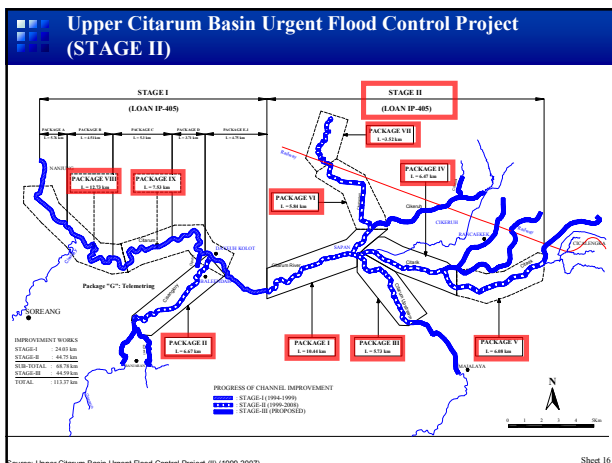
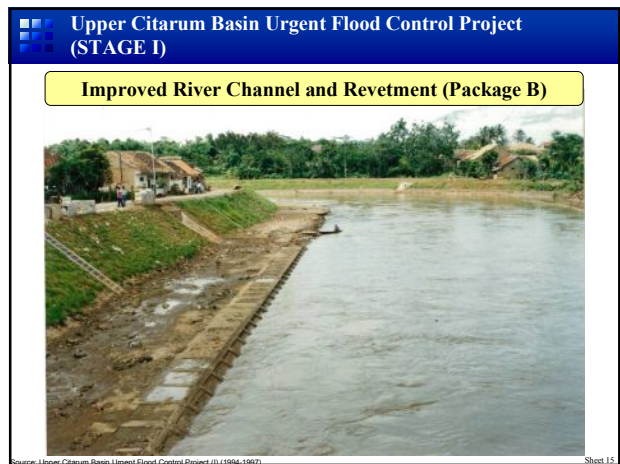


Upper Citarum Basin Urgent Flood Control Project (STAGE I)

River Improvement Works: 24.03 km

CONSTRUCTION WORKS	DESCRIPTION					
	Improv. Length (km)	Contract Value (Rp. Billion)	Contractor	Construction Period	Status	
S T A G E I	A	5.76	8.7	PT. Adhi Karya	1994 – 1996	Completed
	B	4.51	7.8	PT. Adhi Karya	1994 – 1997	Completed
	C	5.30	8.9	PT. BMU & PT. TPP (JO)	1996 – 1998	Completed
	D	3.71	8.1	PT. BMU & PT. TPP (JO)	1996 – 1998	Completed
	E1	4.75	12.8	PT. Brantas Abipraya	1998 – 1999	Completed
	G	-	3.8	PT. Findo Muda	1999	Completed
C O N S O L I D A T I O N	1	-	8.1	PT. Adhi Karya	1998 – 1999	Completed
	2	2.0	4.0	PT. Mandala Bakti Utama	1998 – 1999	Completed
	3	1.40	3.5	PT. Menggala Agung	1998 – 1999	Completed
	4	1.90	3.2	PT. Tunas Fortuna Jaya	1998 – 1999	Completed
	5	1.50	2.7	PT. Mumi Jaya Sempurna	1998 – 1999	Completed

Source: Upper Citarum Basin Urgent Flood Control Project (U) (1999-2003) Sheet 13



Upper Citarum Basin Urgent Flood Control Project (STAGE II)

River Improvement Works: 35.39 km
Channel Improvement Works for Cisaranten River: 9.31km

CONSTRUCTION WORKS	DESCRIPTION					
	Improv. Length (km)	Contract Value (Rp. Billion)	Contractor	Construction Period	Status	
S T A G E I I	I	10.44	30.9	PT. Adhi Karya	1999 – 2003	Completed
	II	6.67	24.4	PT. Pembangunan Perumahan	1999 – 2003	Completed
	III	5.73	18.9	PT. Fajar Parahyangan	2003 – 2005	Completed
	IV	6.47	46.4	PT. Pembangunan Perumahan	2003 – 2005	Completed
	V	6.08	21.6	PT. Penta Ocean	2004 – 2005	On going
	VI	5.84	33.9	PT. Penta Ocean	2004 – 2005	On going

Source: Upper Citarum Basin Urgent Flood Control Project (U) (1999-2003) Sheet 17

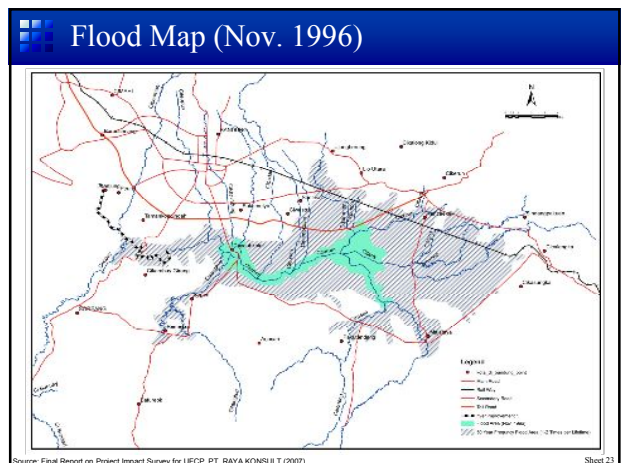
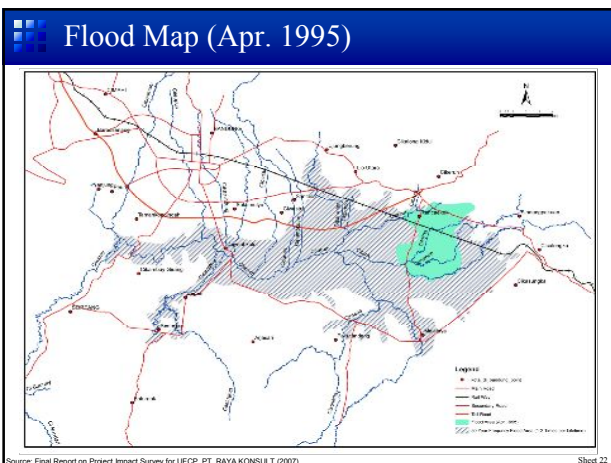
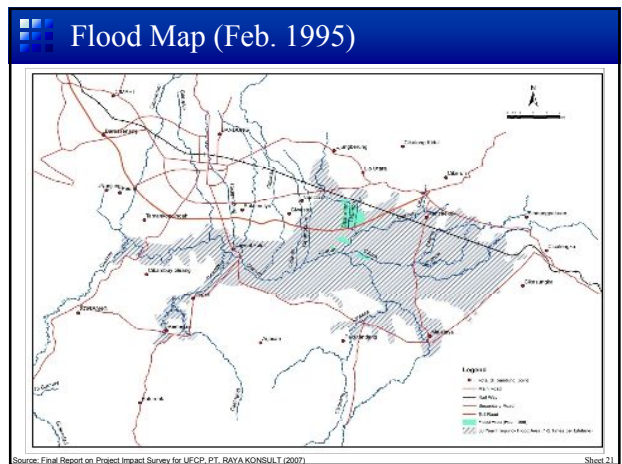
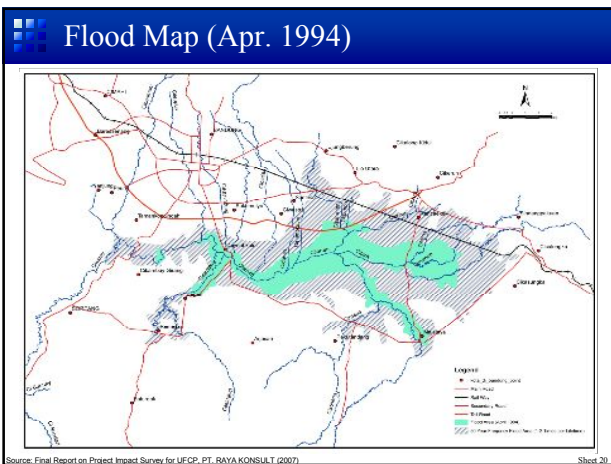
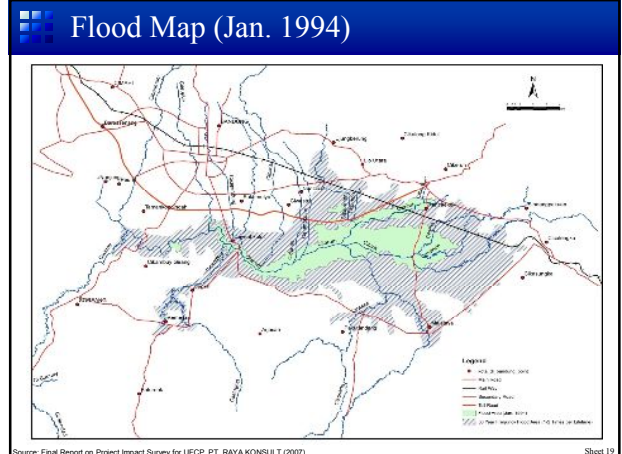
Project Cost

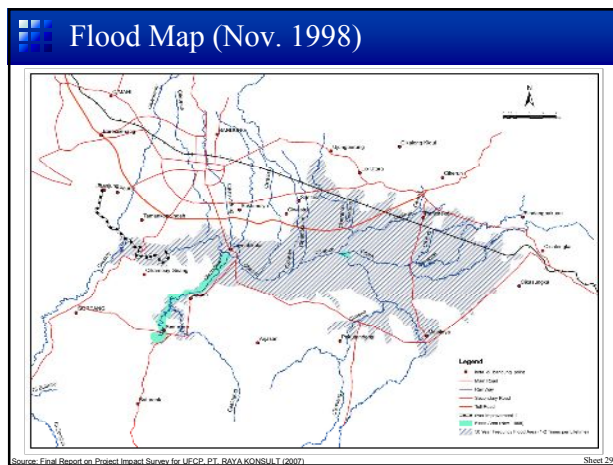
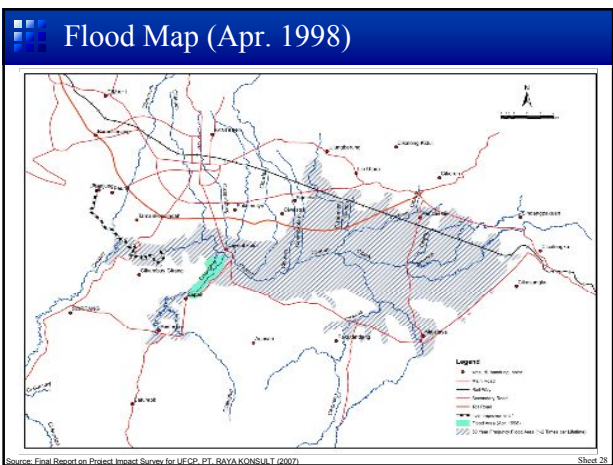
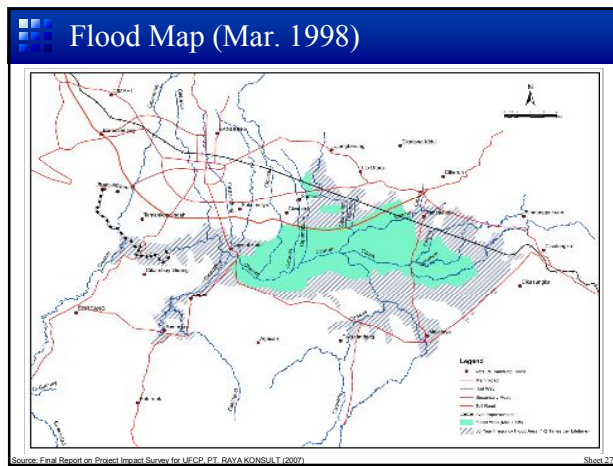
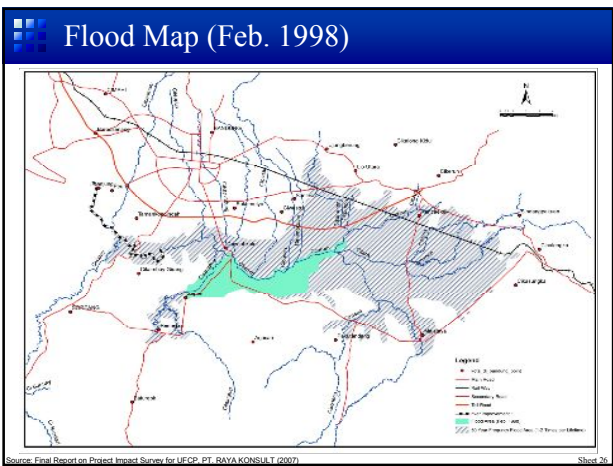
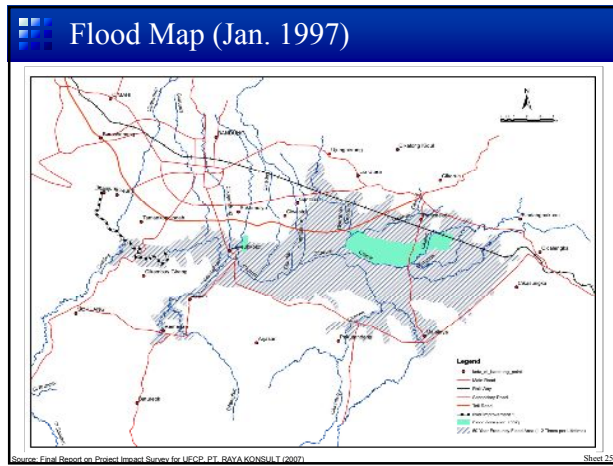
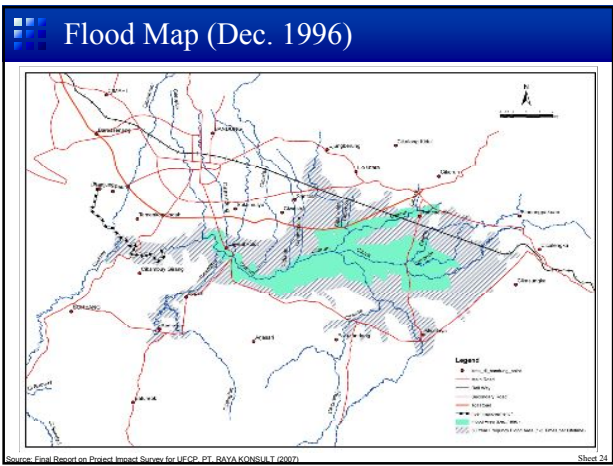
Unit: Million

A. CONSTRUCTION COST AND CONSULTING SERVICES	: US\$ 65.7 (¥ 7,887)
- 1 ST STAGE	: US\$ 26.4 (¥ 3,165)
- 2 ND STAGE	: US\$ 39.3 (¥ 4,722)
B. LAND ACQUISITION, COMPENSATION, AND ADMINISTRATION COST	: US\$ 7.0 (Rp.62,632)
- 1 ST STAGE	: US\$ 1.8 (Rp.16,313)
- 2 ND STAGE	: US\$ 5.2 (Rp.46,319)
TOTAL PROJECT COST	US\$ 72.7

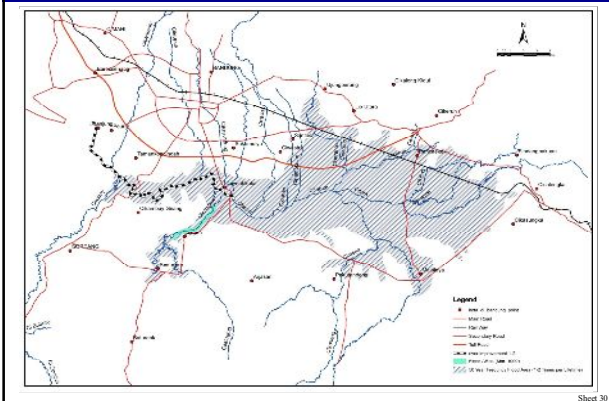
Exchange Rate: US\$ 1.00 = Rp. 9,000 = ¥120

Source: Laporan Tahunan PT. RAYA KONSULT (2007) Sheet 18

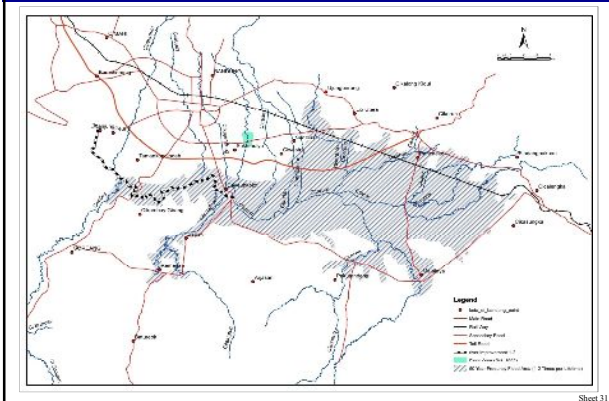




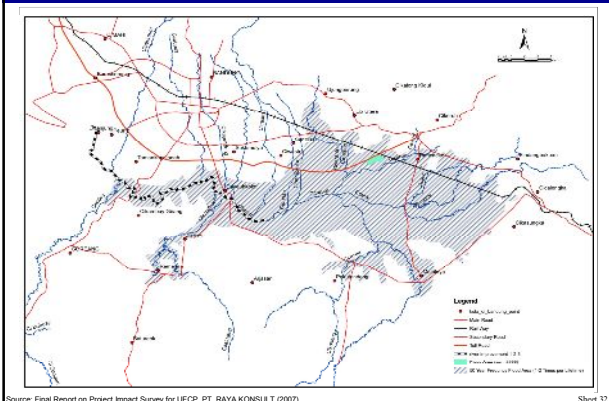
Flood Map (Mar. 1999)



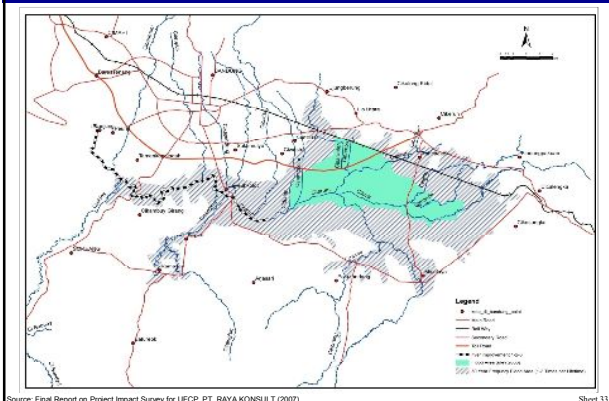
Flood Map (Oct. 1999)



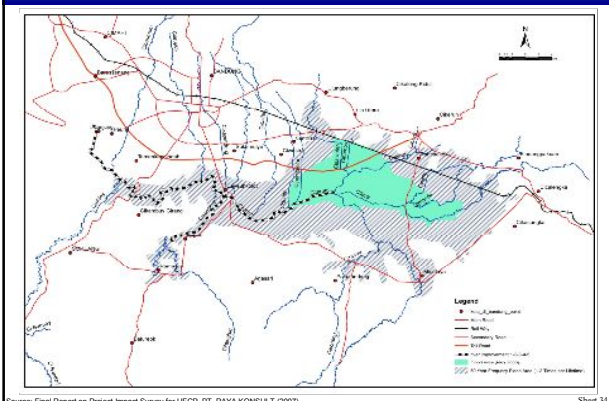
Flood Map (Jan. 2000)



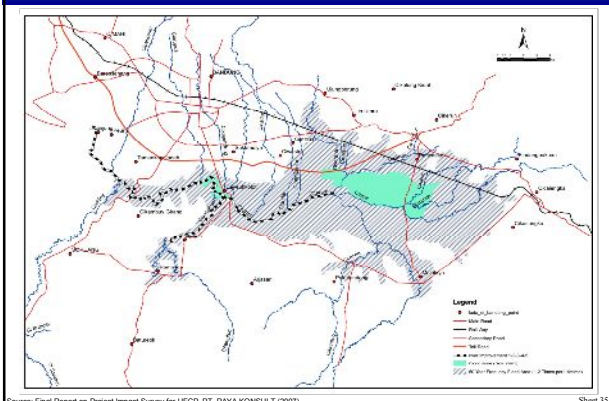
Flood Map (May 2000)



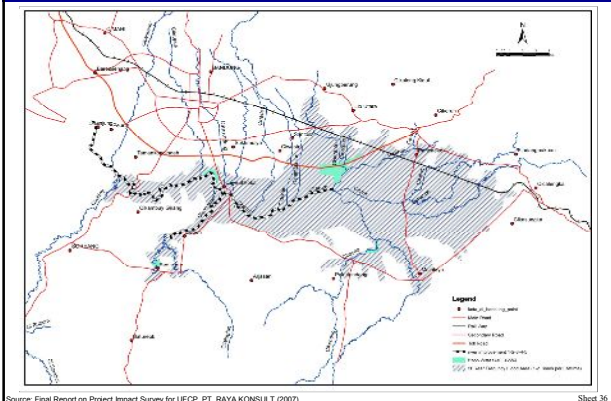
Flood Map (Apr. 2001)



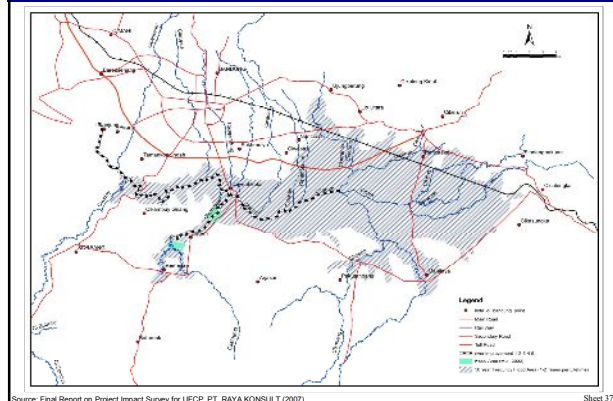
Flood Map (Nov. 2001)



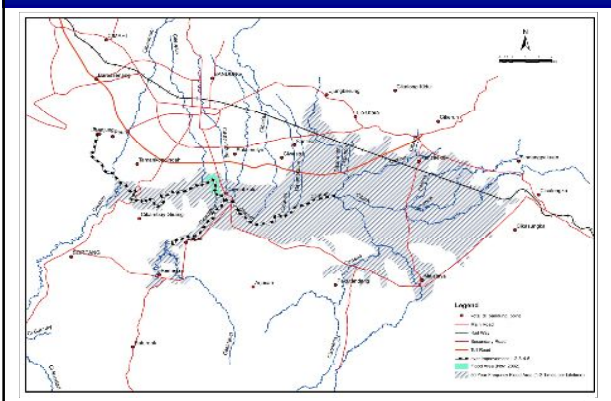
Flood Map (Jan. 2002)



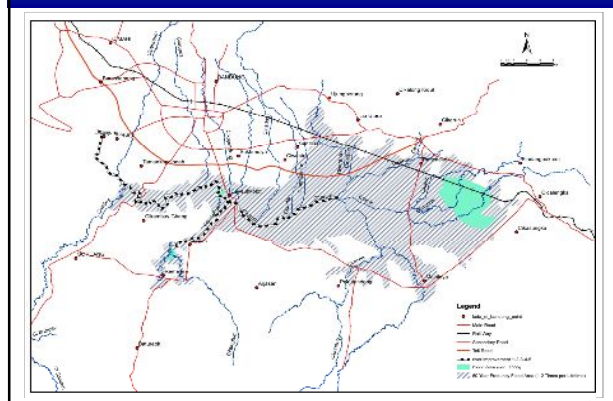
Flood Map (Mar. 2002)



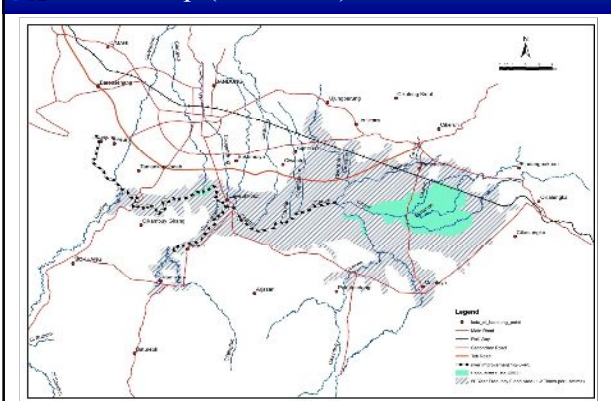
Flood Map (Nov. 2002)



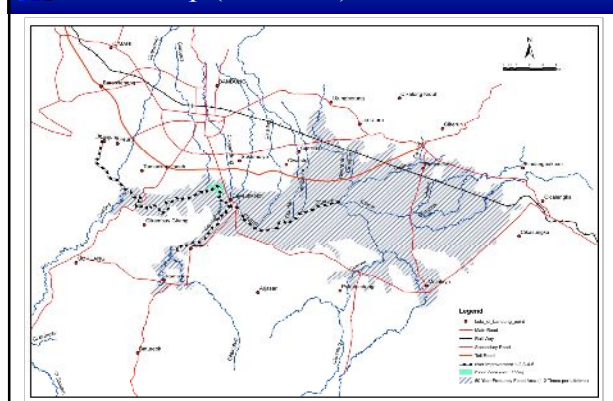
Flood Map (Jan. 2003)



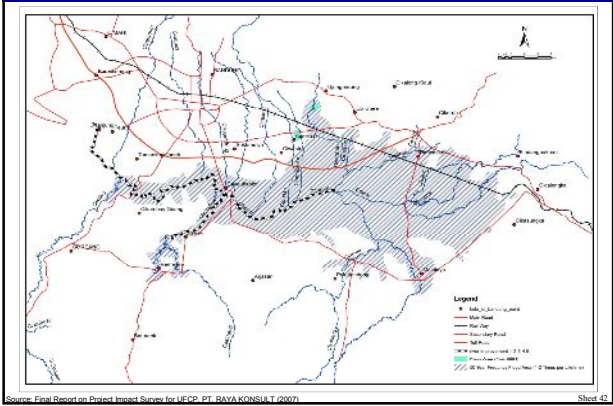
Flood Map (Feb. 2003)



Flood Map (Jan. 2004)

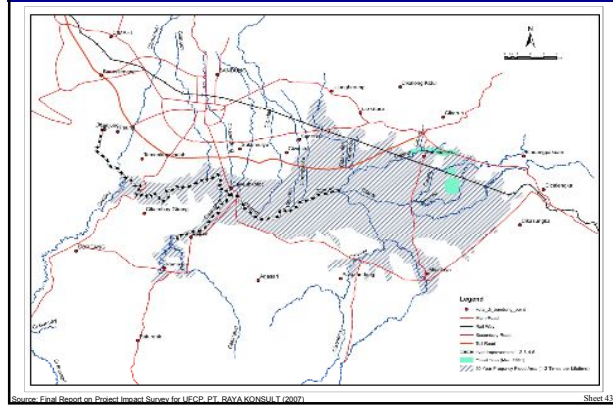


Flood Map (Feb. 2004)



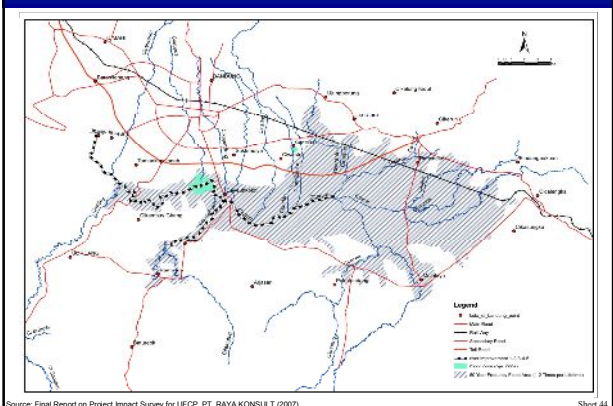
Source: Final Report on Project Impact Survey for UECP, PT. RAYA KONSULT (2007) Sheet 43

Flood Map (Mar. 2004)



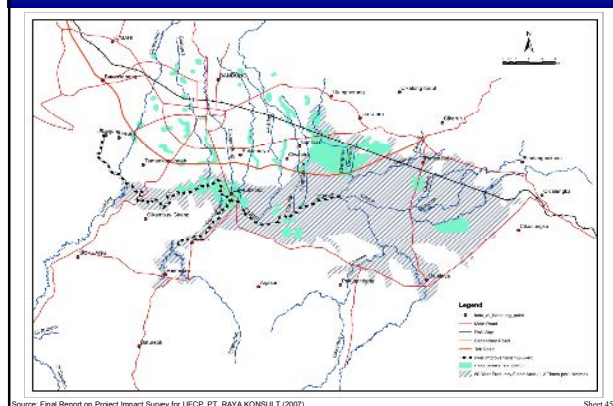
Source: Final Report on Project Impact Survey for UECP, PT. RAYA KONSULT (2007) Sheet 43

Flood Map (Apr. 2004)



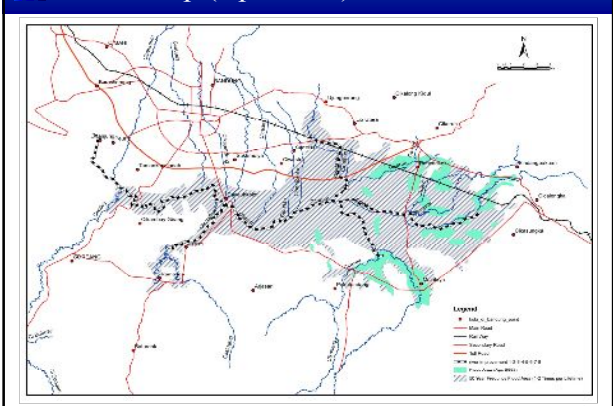
Source: Final Report on Project Impact Survey for UECP, PT. RAYA KONSULT (2007) Sheet 44

Flood Map (Feb. 2005)



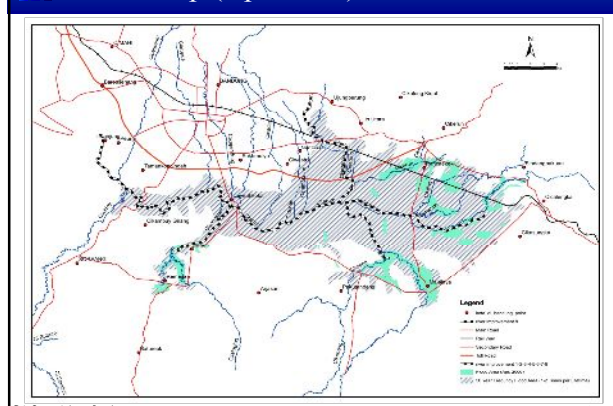
Source: Final Report on Project Impact Survey for UECP, PT. RAYA KONSULT (2007) Sheet 45

Flood Map (Apr. 2005)

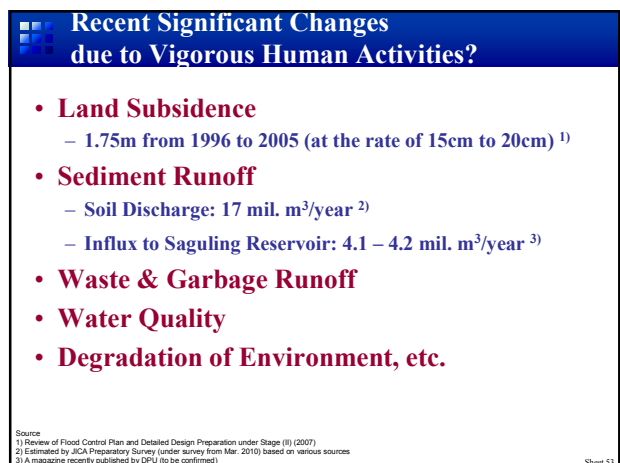
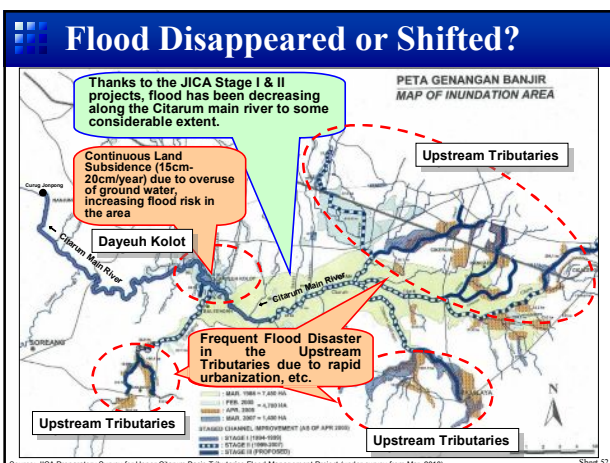
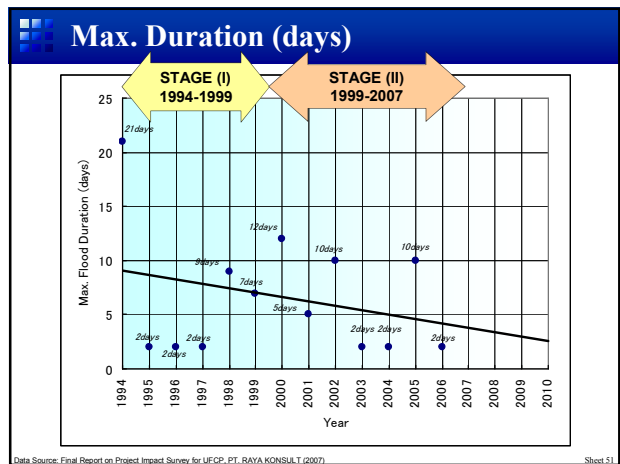
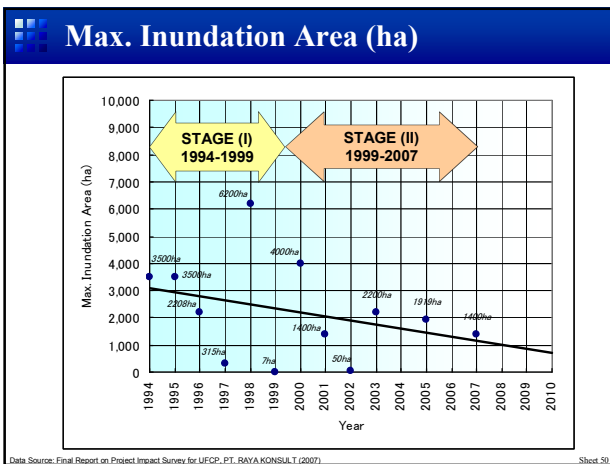
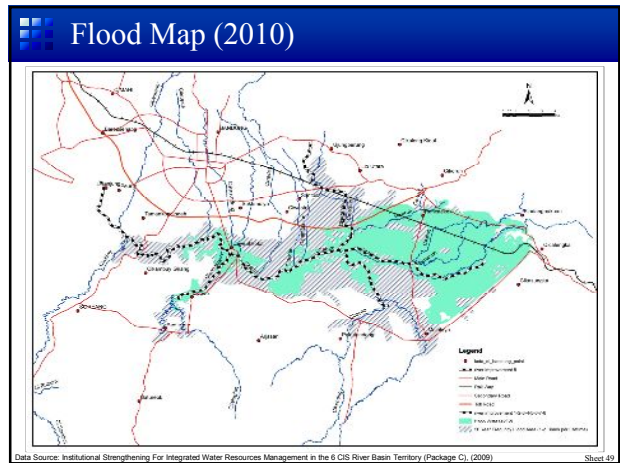
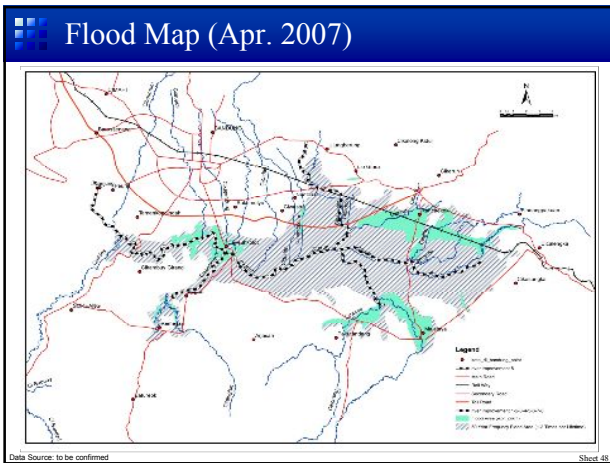


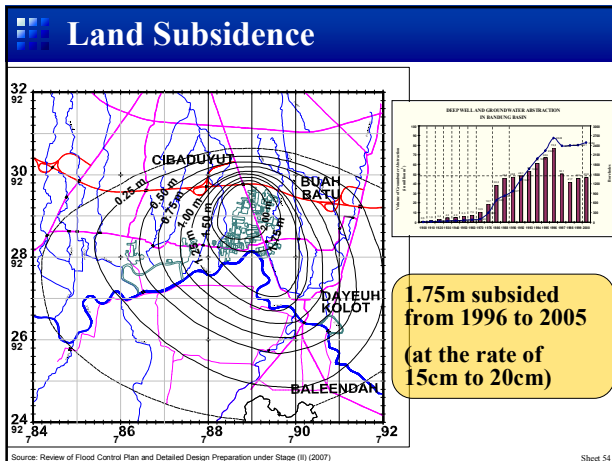
Source: Final Report on Project Impact Survey for UECP, PT. RAYA KONSULT (2007) Sheet 46

Flood Map (Apr. 2006)



Data Source: to be confirmed Sheet 47





Sediment Runoff

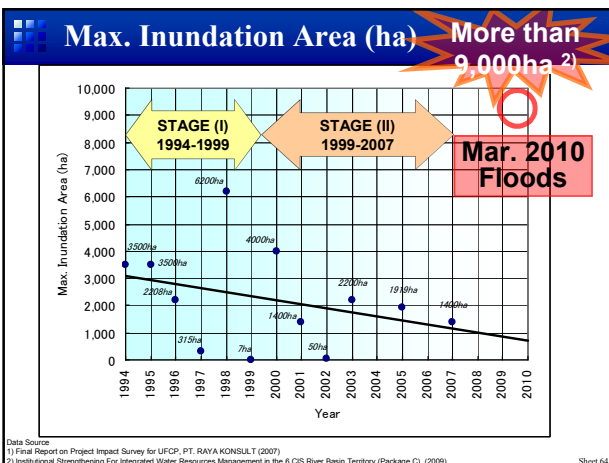
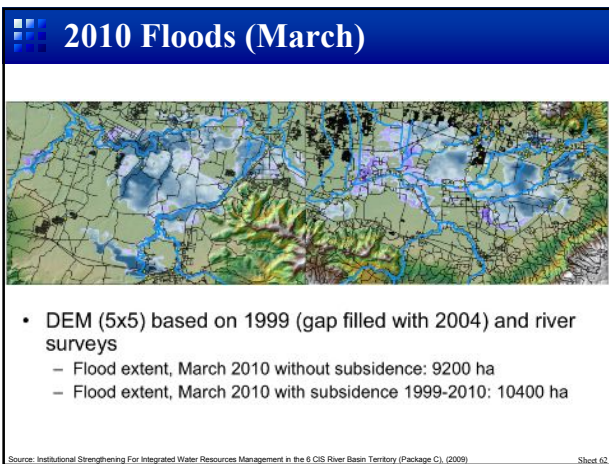
Cultivation in Agricultural Area, Population Pressure and might cause deterioration of Mountainous Area ¹⁾

Cultivation in steep terrain
Soil Discharge: 17 mil. m³/year ²⁾
Influx to Saguling Reservoir: 4.1 – 4.2 mil. m³/year ³⁾

Forrest Collapse

Source: 1) Upland Plantation and Land Development Project at Citikang Sub-Watershed (Project by JBIC Loan IP-455)
2) Estimated by JICA Preparatory Survey (under survey from Mar. 2010) based on various sources
3) A magazine recently published by DRU (to be confirmed)



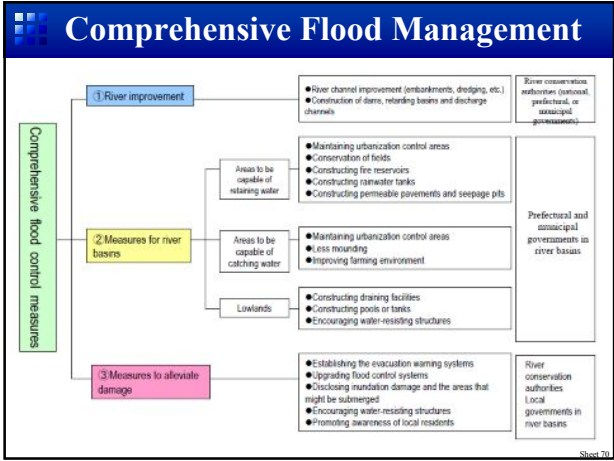
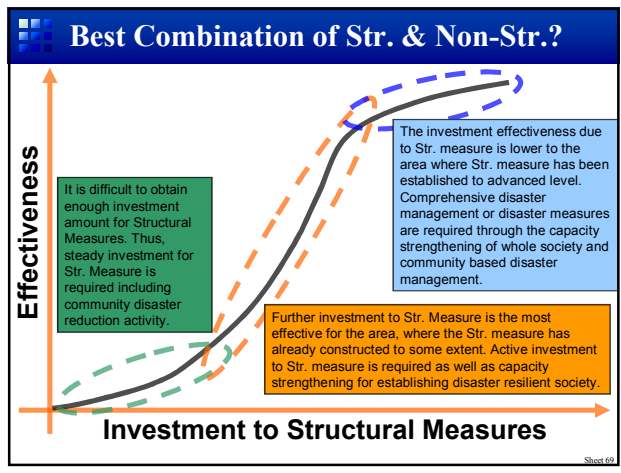
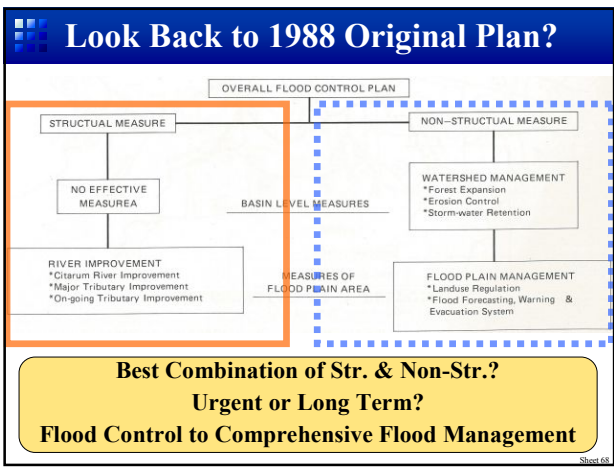
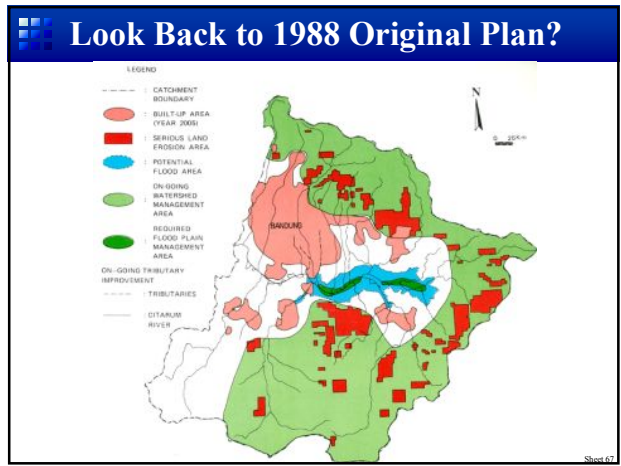


- ### 2010 Floods caused by
- What is the factors?
 - Excessive Amount of Rainfall?
 - Global Warming Effects?
 - Upstream Forest Area Degradation?
 - Sedimentation?
 - Continuous Land Subsidence?
 - Others?
- If we allow this to continue, flood disasters in the Upper Citarum Basin will inhibit regional development.
- Sheet 65

What should be done against Flood Disaster?

- Structural Measures**
 - River Improvement
 - Dyke, Flood Wall
 - Pumping Station
 - Dredge, Excavation, etc.?
- Non-Structural Measures**
 - Watershed (River Basin) Management
 - Sediment Runoff Control
 - Land Use
 - Operation & Maintenance
 - Early Warning System
 - Evacuation System
 - Public Participation, etc.?

Sheet 66



Thank you for your attention.

Terima Kasih



Preparation Selection Urgent Flood Mitigation Works in the Upper Citarum Basin, Bandung, May 17, 2010

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project

Objectives, Goals and Planning

Kenichiro KATO, P.E.,Jp (C.E.) | M.Sc. | M.Eng.

Team Leader

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project



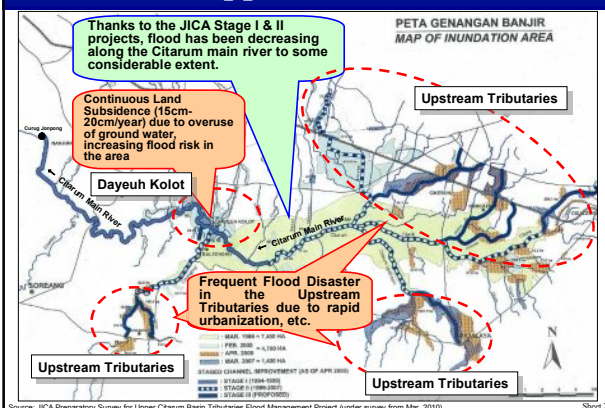
Background

- Thanks to the JICA Stage I & II projects, flood has been decreasing along the Citarum main river to some considerable extent.
- Frequent Flood Disasters in the Upstream Tributaries are still remaining.
- GOI requested ODA Loan Assistance to GOJ for River Improvement Works of the nine tributaries in the Upper Citarum Basin as the urgent prioritized project based on the Detailed Design Preparation for Stage III (2007).

Source: JICA Preparatory Survey Team

Sheet 1

Flood Disappeared or Shifted?



Flood Risks?

- After the river improvement works at nine tributaries, what will be happening?
- Flood risks along the nine tributaries will decrease.
- Peak discharge into the Citarum main river may increase to some considerable amount.
- It may cause "Flood Risk" higher at the area of Dayeuh Kolot because of continuous land subsidence.

What can be the remedial measures?

Source: JICA Preparatory Survey Team

Sheet 2

Objectives of Preparatory Survey (PS)

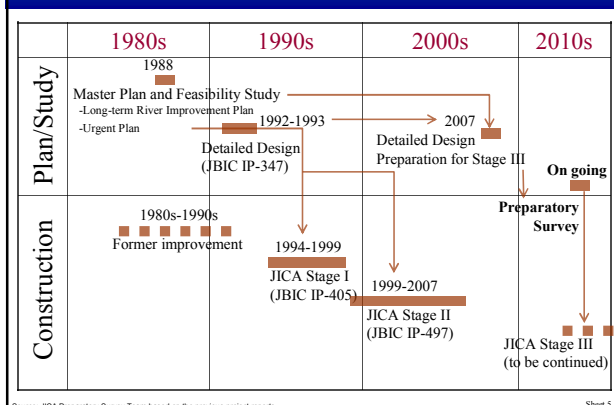
- Formulation of Official Development Assistance (ODA) loan project to minimize flood damage occurrence along the upper tributaries of Citarum river
- Proposition of associated technical assistance for improving water-related issues in terms of river basin (watershed) management

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010), compiled from original sources

Sheet 4



Plan and Improvement Works for the Upper Citarum Basin



Source: JICA Preparatory Survey Team based on the previous project records

Sheet 5

Scope of Preparatory Survey (PS)

1. Review of the background and necessity of the Project
2. Review of the Feasibility of the Project
3. Identify other issues of concern and propose necessary countermeasures for identified concerns
4. Evaluation of the Project Implementation and O&M Framework
5. Evaluation of the Benefit of the Project
6. Assessment of the Environmental and Social Considerations

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010)

PS Schedule

We are here. (May 17th)

Year	2010							
Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	1	2	3	4	5	6	7	8
Work in Indonesia								
Work in Japan								
Report	ICR			IR			DFR	FR

ICR: Inception Report, IR: Interim Report, DFR: Draft Final Report, FR: Final Report

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010)

PS Schedule

We are here. (May 17th)

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010)

PS Members

- Team Leader/Flood Control Plan
- Deputy Team Leader/River Basin Management
- Hydrology/Hydraulic Analysis
- Geology/Geotechnical Analysis
- Flood Control Plan
- Design and Cost Estimation
- Economic and Financial Analysis
- Social Consideration/Organization
- Environmental Consideration/Protection
- Coordinator

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010)

Flood Control Plan (Tentative Alternatives)

Location	Flood Control plan
A) Upper Tributaries	1) 9 tributaries river channel improvement 2) Distributed storages 3) Implementation other than 9 tributaries
B) Citarum Main	4) Excavation of river channel 5) Flood-wall in Dayeuh Kolot Area 6) Dyke nearby Dayeuh Kolot Area 7) Retarding reservoir –A: one big reservoir 8) Retarding reservoir –B: several reservoirs distributed 9) Diversion, etc.

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010)

Selection Criteria of Sub-Project (Tentative Alternatives)

- Future Perspective
 - Urgent Plan (Short Term): 1/5
 - Mid-Long Term Plan: more than 1/20
- Current Execution Plan Status
 - Planned by Indonesian Initiatives
 - Planned by International Donor Agencies
- Regional Characteristics
 - Number of Beneficiaries
 - Reduction of Flood Damage
- Economical Effectiveness, etc.
 - EIRR (Economic Internal Return Rate)

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010)

Selection Image of Sub-Project (Tentative Alternatives)

Location	Flood Control Plan	Term		Plan	etc.
		U	LT		
A) Upper Tributaries	1) 9 tributaries river channel impv.	○	○	-	...
	2) Distributed storages	△	○	-	...
	3) Implementation other than 9 tributaries	△	○	○	...
B) Citarum Main	4) Excavation of river channel	○	○	○	...
	5) Flood-wall in Dayeuh Kolot Area	△	○	○	...
	6) Dyke nearby Dayeuh Kolot Area	△	○	○	...
	7) Retarding reservoir –A: A big reservoir	-	○	-	...
	8) Retarding reservoir –B: Distributed	-	○	-	...
	9) Diversion, etc.	-	○	-	...

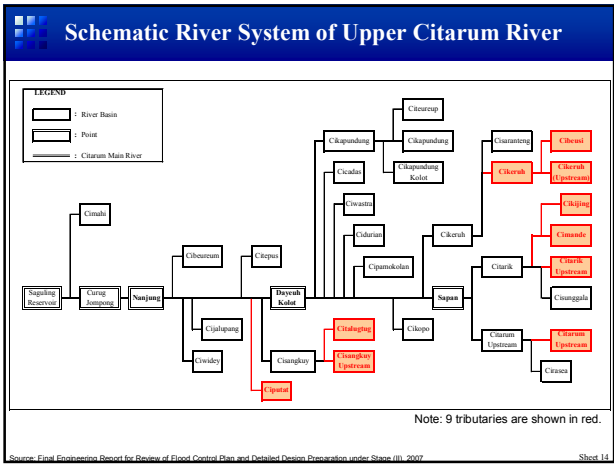
U: Urgent (1/5 years), LT: Long Term (1/20 years), GOI: Indonesian Govt.
 ○: Appropriate, △: Appropriate in some cases, -: Not appropriate or unknown

Source: JICA Preparatory Survey Team Sheet 12

9 tributaries in the report of 2007

River	Section	Extent (km)	Discharge (m ³ /s)	Term
Citarum Upstream River	Kantren – Majalaya	5.45	75	1/5 years (Urgent)
Citarik Upstream River	Bojong Gempol – Citarik	3.73	40	
Cimande River	Langensari – Bojong Menja	4.05	35 – 50	
Cikijing River	Tangeung – Cikijing	4.82	50	
Cikeruh River	Ranca Kamuning – Sirna Garih	9.58	50 – 60	
Cibeusi River	Buah Dua – Cipacing	6.68	50	
Cisangkuy Upstream River	Ranca Enggang – Kamasan	7.65	115	
Ciputat River	Ciputat – Kulalet Hilir	1.36	5	
Citalugtug River	Waas – Cileutik	0.66	85 – 90	
Total		43.98		

Source: Implementation Program Construction Stage-III, Upper Citarum Basin Upstream Flood Control Project, BBUWSC, 2007.8 Sheet 13



Cibeusi

Weir for irrigation use

Cibeusi

Garbage

Bank lateral erosion
They maintain the bank in conventional bamboo barrier.

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 15

Cikeruh

There is no garbage.
Relatively clean river

Cikeruh

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 16

Cinunggal / Cikijing


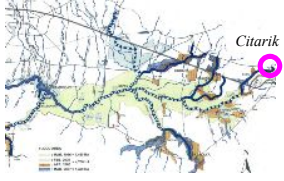
There is no garbage.
Relatively clean river by sight, but highly contaminated by mercury.

Cikijing


JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 17

Citarik


Citarik is a raised bed river.

Flood prone area because of inundation



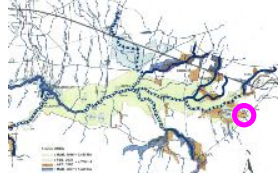

The view from Citarik



Domestic wastewater effluent to Citarik

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 18

Paddy field

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 19

Majalaya – upstream Citarum -1


Textile factory



-There are many textile factories which caused subsidence.
-Factories need a large amount of water to dye or cool machines.
-Dyeing caused serious mercury contamination.




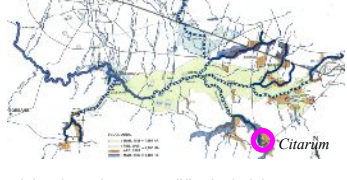
-They throw garbage away in front of the sign "DON'T LITTER HERE!". How bold!



JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 20

Majalaya – upstream Citarum -2

Sand quarry






-Their sand collection may cause sliding river bank down.
-Officers forbid it, but they don't stop it because it is profitable.




JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 21


Bojongsari Bridge- upstream Citarum-3

Garbage



Bank lateral erosion
The house is in dangerous condition.



JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 22

Brick works at Raneakasumba


-There are many brick home industries.




-Molding capacity per man is 700-1000 each for a day.



-They catch fishes only in rainy season because fishes may smell bad according to small flow discharge in dry season.



JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 23

Confluence of Cirasea flowing into Citarum

Cirasea river.
Implemented by local government with local budget.

Citarum river.

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 24

Confluence of Cimande flowing into Citarik

Cimande river

Citarik

Ranjakemit weir at Citarik

-Paddy fields may be suitable for retarding reservoir

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 25

Cikeruh

Railway bridge sinks during flood.
It needs to be lifted up to 1m above because flow has a tendency to increase recently. However, in order to lift up the bridge, the reconstruction of railway in both sides will be required.

They has implemented quick fix with double bamboo barrier and sand bag

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 26

Citarum- River vicinity of Sapan Bridge

- Bank lateral erosion occurred seriously.
- Excavation sands at Stage II dumped to ox-bows.
- Conventional irrigation weirs that are made by farmers causes sedimentation at riverbed.
- Crops on berm cause sedimentation at berm.

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 27

Baleendah Bridge

These houses were damaged by Mar. 2010 flood

- Water level rose at 30cm below bridge girder during Mar. 2010 flood.

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 28

Dayeuh Kolot – Flooded area

Flood mark




Flood mark

Still muddy at flooded area

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Sheet 29

Ciputat

Citarum at Dayeuh Kolot

Ciputat is one of 9 tributaries, but the implementation of it may not be effective because it is small and short(1km) river (local drain).

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood

Sheet 30

Oxbow



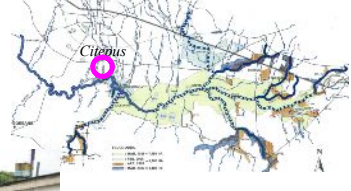



The Oxbow is used as garbage dump. Landfill oxbows with excavation sand is one of the options.

JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood

Sheet 31

Citepus


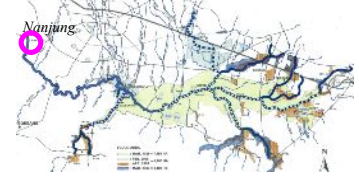



The water quality of *Citepus* is highly deteriorated. hydrogen sulfide is generated poisonously.


JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood

Sheet 32

Nanjung

Textile factory

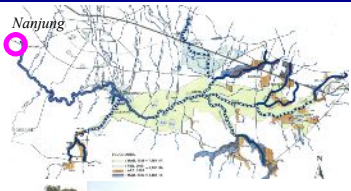


Water level observation station by PusAir.


JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood

Sheet 33

Nanjung – Curug Jompong Fall



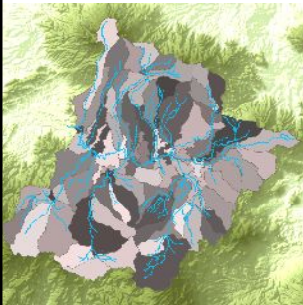
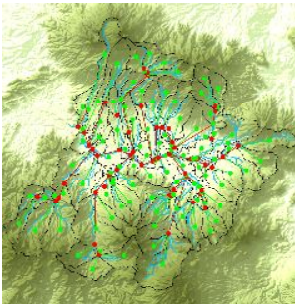
The drop of the fall is 7m. The backwater of downstream *Saguling* reservoir doesn't reach the upstream of the fall.



JICA Demonstration System for Upper Citarum Basin Tributaries Flood

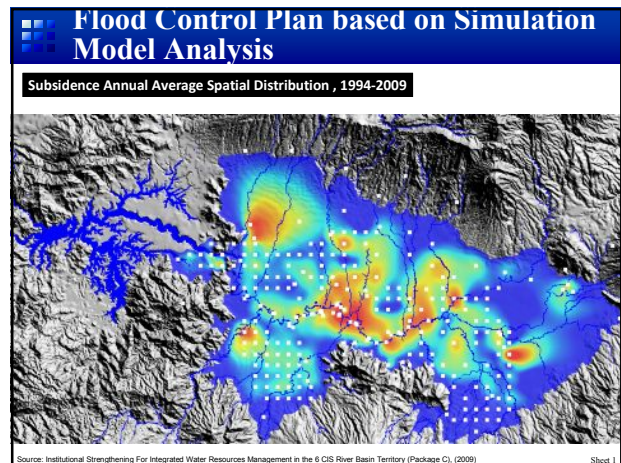
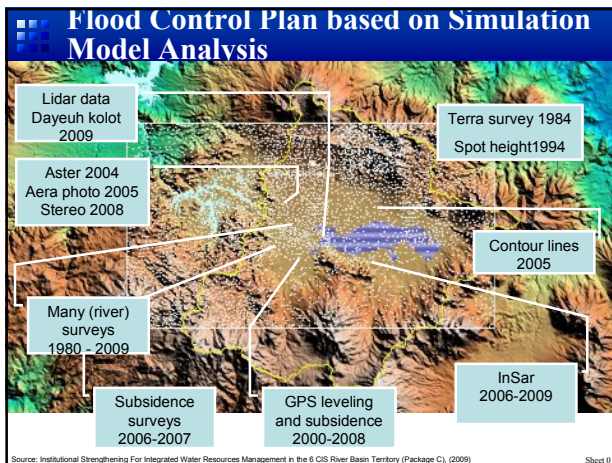
Sheet 34

Flood Control Plan based on Simulation Model Analysis

Source: Institutional Strengthening For Integrated Water Resources Management in the 6 CIS River Basin Territory (Package C), (2009)

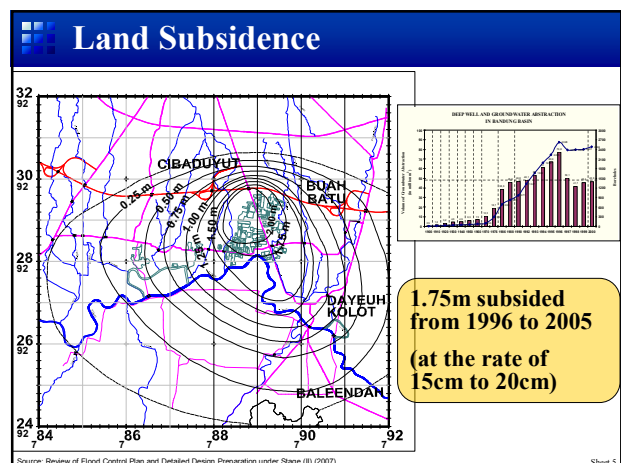
Sheet 35



- ### After the workshop
- **Flood Control Plan (Urgent Plan)**
 - Late of Jun.
 - **Environmental Considerations (EIA)**
 - **Land Acquisition and Resettlement (LARAP)**
 - **Design and Cost Estimate**
 - Jul. to Aug.
 - **Economic Analysis**
 - Aug. to Sep.
 - **Next Workshop**
 - End of Aug. or Beginning of Oct.
- Source: JICA Preparatory Survey Team Sheet 2



- ### River Basin (watershed) Management
- **Possible JICA assistance in coordination with concerned stakeholders**
 - Not only Flood Control and Management but also there are outstanding water-related issues closely related to flood disaster.
 - Land Subsidence, Sediment Runoff and Waste & Garbage Runoff seem to be the most serious issues.
 - Environmental issues (e.g. water quality, degraded oxbow, etc.) are also critical.
 - Close Coordination for River Basin (watershed) Management is urgently needed.
- Source: JICA Preparatory Survey Team Sheet 3

- ### Recent Significant Changes due to Vigorous Human Activities?
- **Land Subsidence**
 - 1.75m from 1996 to 2005 (at the rate of 15cm to 20cm)¹⁾
 - **Sediment Runoff**
 - Soil Discharge: 17 mil. m³/year²⁾
 - Influx to Saguling Reservoir: 4.1 – 4.2 mil. m³/year³⁾
 - **Waste & Garbage Runoff**
 - **Water Quality**
 - **Degradation of Environment, etc.**
- Source:
 1) Review of Flood Control Plan and Detailed Design Preparation under Stage (II) (2007)
 2) Estimated by JICA Preparatory Survey (under survey from Mar. 2010) based on various sources
 3) A magazine recently published by GPRU (to be confirmed)
- Sheet 4



Sediment Runoff

Cultivation in Agricultural Area, Population Pressure and might cause deterioration of Mountainous Area ¹⁾


Cultivation in steep terrain **Forrest Collapse**
Soil Discharge: 17 mil. m³/year ²⁾
Influx to Saguling Reservoir: 4.1 – 4.2 mil. m³/year ³⁾

Source: 1) Upland Plantation and Land Development Project at Ciklik Sub-Watershed (Project by JBIC Loan IP-455)
 2) Estimated by JICA Preparatory Survey (under survey from Mar. 2010) based on various sources
 3) A magazine recently published by DRU (to be confirmed)

Sheet 6

Sediment Runoff

July 1999 at Dayeuh Kolot Bridge



Source: Institutional Strengthening For Integrated Water Resources Management in the 6 CIS River Basin Territory (Package C), (2009)

Sheet 9

Waste & Garbage Runoff



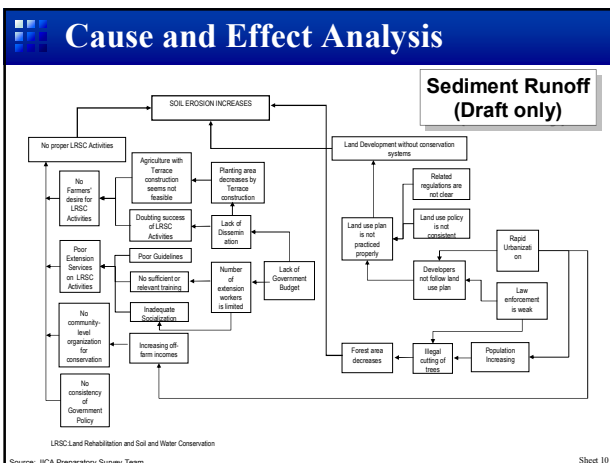
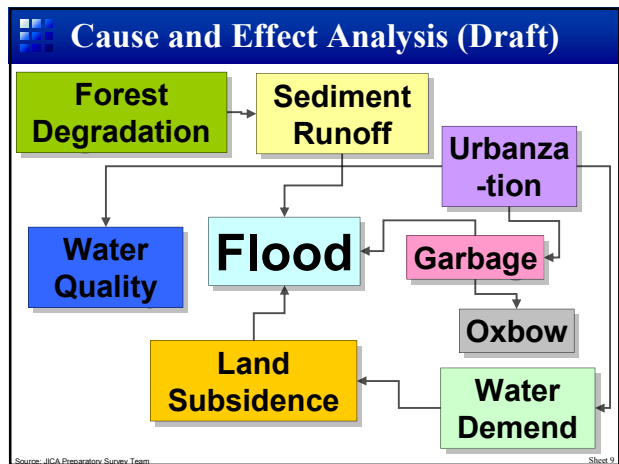
Picture 2:
Clogged Ditch along road (Majalaya)



Picture 1:
Waste or Garbage accumulated alongside of river bank

Source: 1) A Story & Photos from Upstream – CITARUM RIVER
 2) Picture taken by a survey team member of JICA Preparatory Study (Feb. 2010)

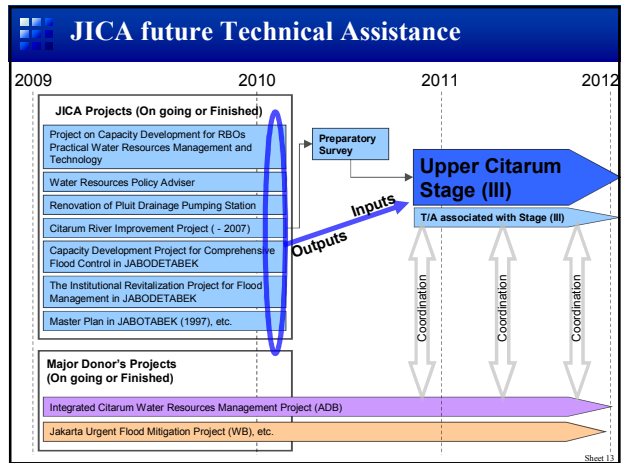
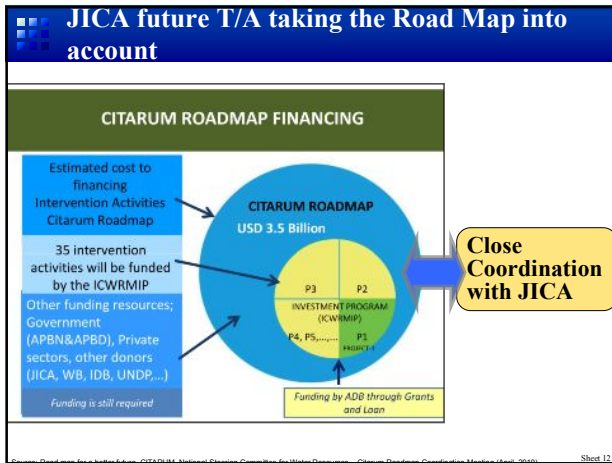
Sheet 8



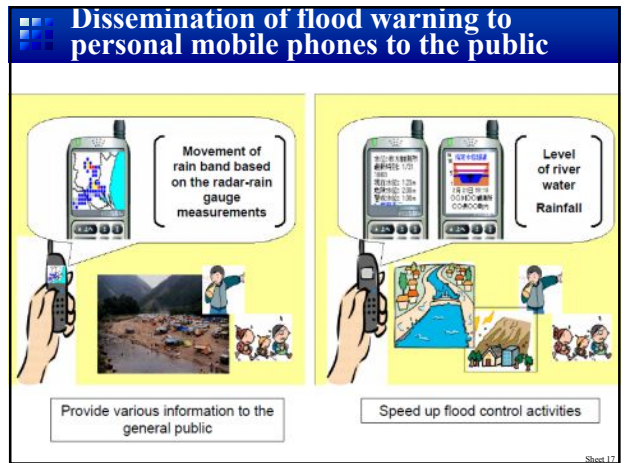
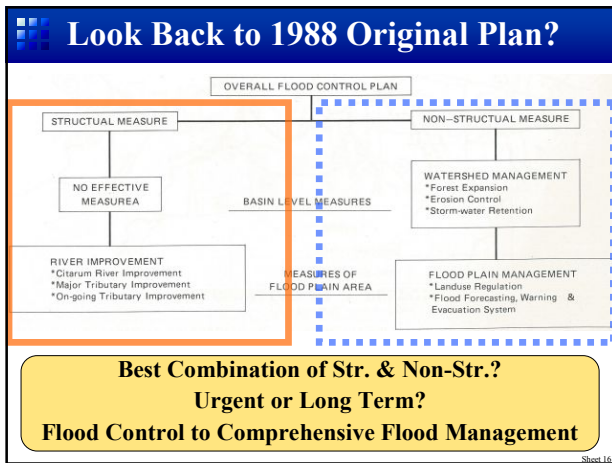
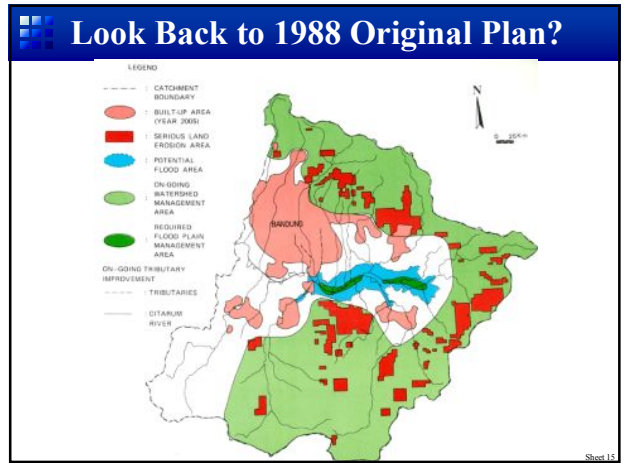
Issues and Technical Cooperation related flood (Tentative Draft only)

	Issues	Technical Assistance
River basin management	There are many issues related to water such as flood, land subsidence, heavy metal, sediment discharge, water quality and waste etc. These issues are intricately intertwined and each measure is not the fundamental solution for these issues.	<ul style="list-style-type: none"> Comprehensive assistance for technical cooperation programs toward overall solutions on the river basin issues
Land subsidence	In the area of Dayeuh Kolot, the land subsidence due to the dipping up the groundwater seriously causes the damage of the infrastructure facilities such as crack of the roads and subsidence of the houses. This land subsidence is one of the main factors for flood damages in Dayeuh Kolot occurred in 2005. The progress of the land subsidence increases the risk of flood damages.	<ul style="list-style-type: none"> According to the groundwater management, the cultivation of groundwater, utilizing retention ponds mitigates the land subsidence. Recommend the goal of groundwater maintenance, and set up the indicators for monitoring, maintenance of water quantity and quality, prevention of the land subsidence, assistance of groundwater maintenance and development activities.
Sediment runoff	In the mountain area of Cititarum river, the sediment discharge is one of the significant issues. JICA loan project "The Upland Plantation and Land Development Project at Ciklik Subwatershed" was implemented. However some sediment has still been there. The sediment discharge from upstream causes the reduction of conveyance function and the increase of flood risk. The decrease on the capacity of dam in the downstream due to the sediment is also considered seriously.	<ul style="list-style-type: none"> Restraint of the sediment discharge and cultivation measures of overhead with the participation of residents which was implemented in "The Upland Plantation and Land Development Project at Ciklik Subwatershed" are conducted in other mountain areas.
Water quality	Some parts of Development on the public sewerages in Bandung are implemented. In fact, most waste water is discharged to rivers. Considered the environment development in river basin and each kind of water utilization in the downstream such as power generation water, agricultural water and water source for Jakarta, the development of water quality is necessary.	<ul style="list-style-type: none"> In order to maintain the water quality, the prevention against inflow of waste and enhancement of regulation for waste water factories are assisted. In order to maintain the river environment with good conditions, and prevent the impacts on the agriculture in the downstream dam lake, development measures for water quality including the development of sewerage are considered.
Waste/Garbage	There are the collecting systems by the garbage trucks, however the capacity of the collection is not enough for the amount of waste. As the result, the wastes are discharged into rivers in the areas of Dayeuh Kolot, when excavating the riverbed, large quantities of wastes are mixed. In the urban areas, due to the accumulation of garbage, the function of conveyance is decreased.	<ul style="list-style-type: none"> Consider the measures to prevent against the inflow of waste, conserve the river environment and maintain the function of river flow. Plan the capacity development on waste disposal not to inflow the wastes into river and enhancement of systems decreased.

Sheet 11



- ### Non-Structural Countermeasures
- Watershed (River Basin) Management
 - Sediment Runoff Control
 - Land Use
 - Operation & Maintenance
 - Early Warning System
 - Evacuation System
 - Public Participation, etc.?
- Sheet 14

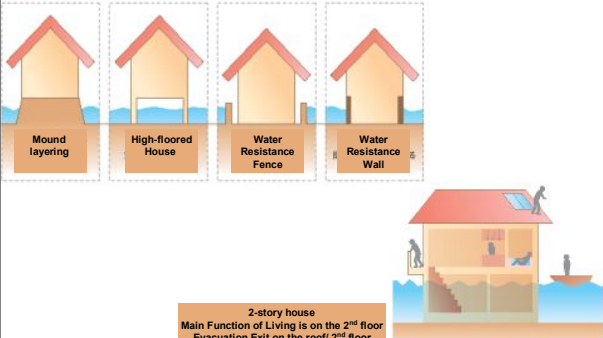


Flood Fighting



Sheet 18

Physical Measures - Water Resistance House-







2-story house
Main Function of Living is on the 2nd floor
Evacuation Exit on the roof/ 2nd floor

Chapter 4-1-3, "A Review of Water-related Disaster Management" <http://www.mhl.go.jp/inet/saigai/kroku/saigai/saigai.html>

Sheet 19

Disaster Prevention Training - Case of Hyogo prefecture -

- Training simulations and actual training exercises with related organizations
- Disaster prevention training that local citizens can take part in
- January 17th has been designate "Hyogo Safety Day"

Sheet 20

Managing Storehouse of Emergency Supplies





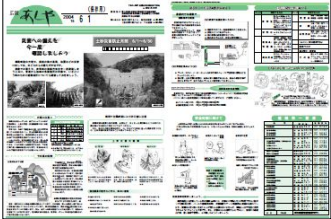
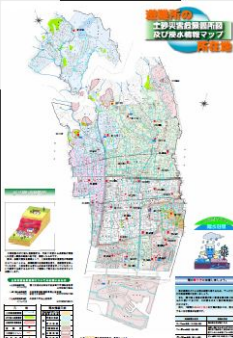
Contents:
Fire Extinguisher, Emergency Food, Water, Rescue Kit, Blue Sheet, Tent, Jack, Chainsaw, Temporary Toilet, etc.

Sheet 21

Raising Public Awareness

Pamphlet, Newsletter

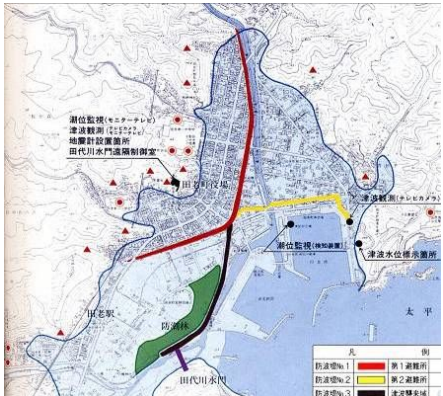
- Hazard Map
- How to Prepare
- etc.

Ashiya city, Hyogo pref.

Sheet 22

Inundation and Evacuation Site Map



Sheet 23

Community Discussion

Sheet 24

Community Discussion for Hazard Mapping at Community Level

Sheet 25

Disaster Drill

Check an evacuation route

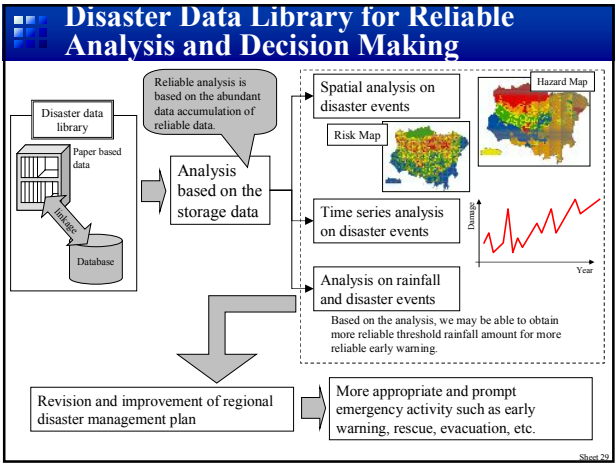
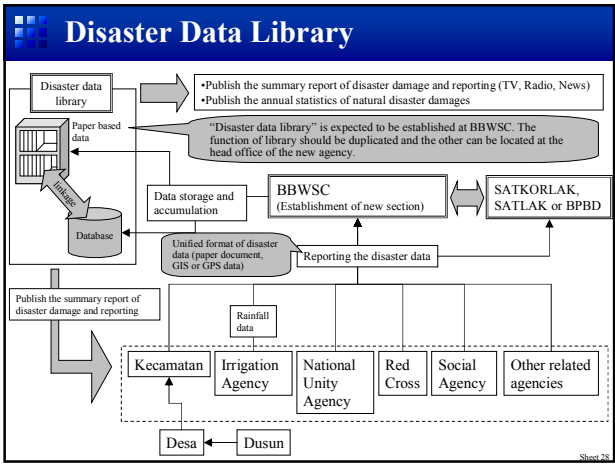
A drill for revival

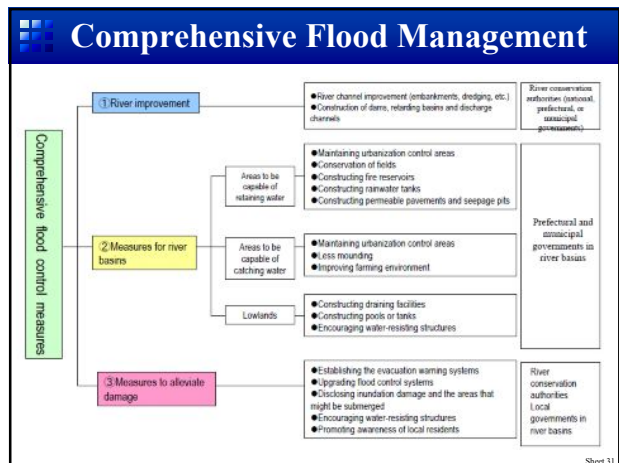
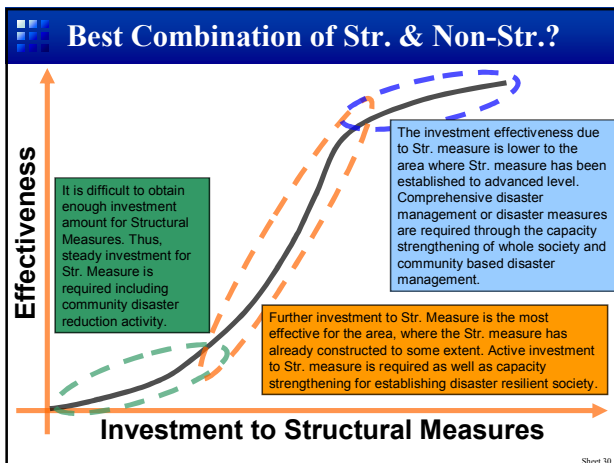
Sheet 26

Disaster Education in Schools

Published by Hyogo Prefectural Education Board

Sheet 27





**2) Presentation during 1st JICA Fact Finding
Mission (July 26th, 2010)**



JICA Preparatory Survey for Upper Citarum Basin
Tributaries Flood Management Project

Selection of Sub-Project as Short List (Tentative) and Discussion

Kenichiro KATO, P.E., Jp (C.E.) | M.Sc. | M.Eng.

Team Leader

JICA Preparatory Survey for Upper Citarum Basin
Tributaries Flood Management Project



Purpose of this presentation

- Discussion or Exchange of Opinions regarding the upcoming Stage (III) project
- Tentative Long List and Short List of Sub-Projects

Sheet 1



Contents

- Background of the Project and the Preparatory Survey
- Issues related to the Project in terms of Flood Control Plan
- Long List, Short List of Sub-Projects

Sheet 2



Background

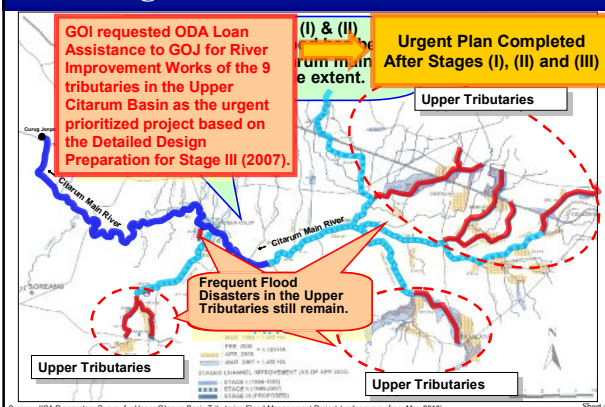
- Flood disaster has been decreasing along the Citarum main river to some considerable extent, thanks to the JICA Stage (I) & (II) projects.
- Frequent Flood Disasters in the Upper Tributaries still remain.
- GOI requested ODA Loan Assistance to GOJ for River Improvement Works of the 9 tributaries in the Upper Citarum Basin as the urgent prioritized project based on the Detailed Design Preparation for Stage III (2007).

Source: JICA Preparatory Survey Team

Sheet 3



Background

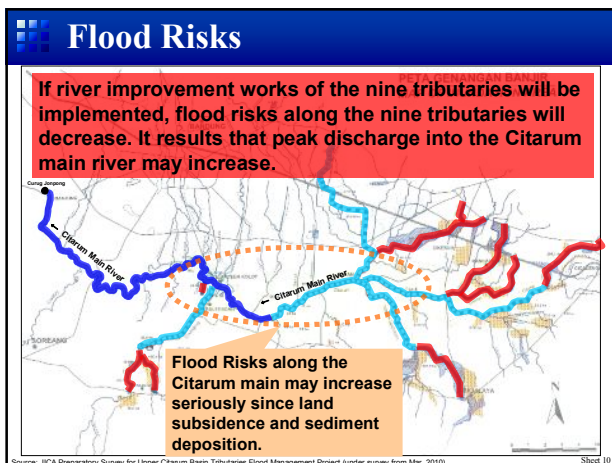
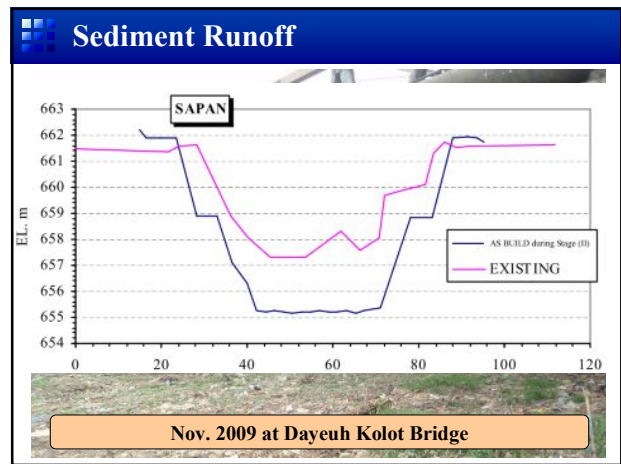
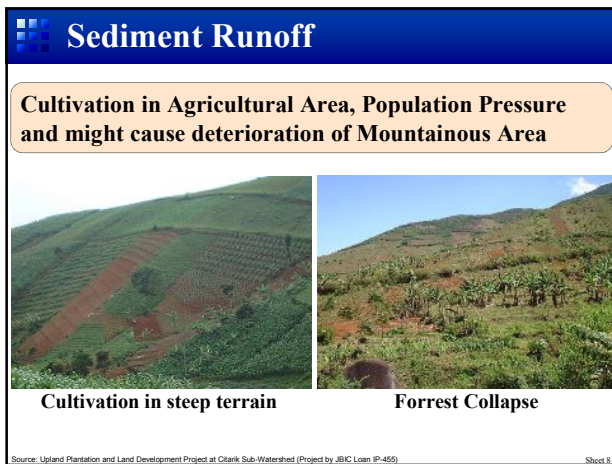
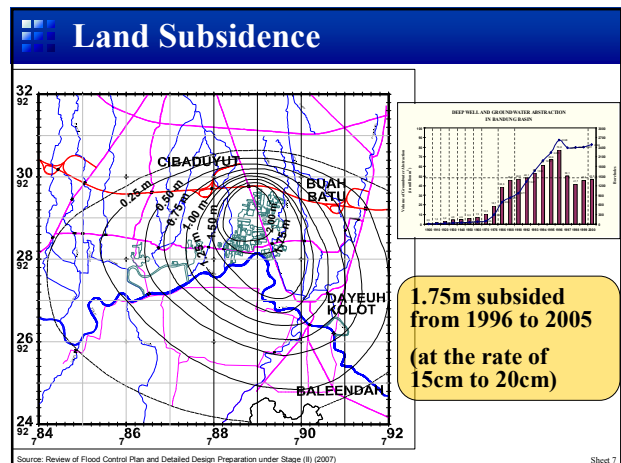
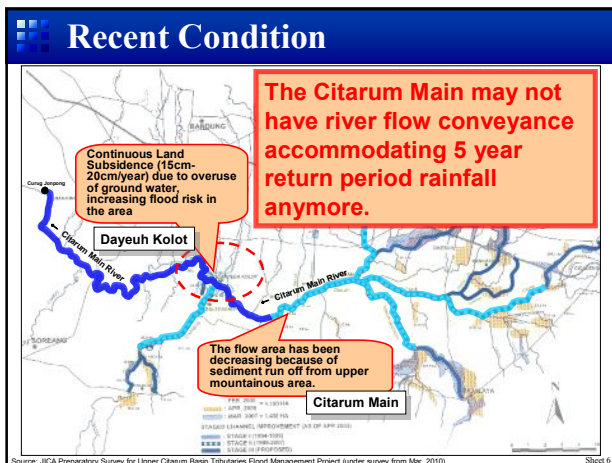


Sheet 4



Recent Condition

- Land Subsidence
 - Continuous Land Subsidence (15cm-20cm/year) due to overuse of ground water, increasing flood risk in the area
- Sediment Deposition
 - The flow area has been decreasing because of sediment run off from upper mountainous area.



- ### What can be the remedial measures?
- **Structural Countermeasures**
 - Tributaries Improvement, Retarding Pond, Excavation Works, Flood Wall around DK, Dyke around DK, Diversion Channel, etc.
 - **Non-Structural Countermeasures**
 - Flood Plain Mngt., EWS, Flood Fighting, Flood Risk Mapping, Evacuation Training, Land Use Limitation, Water Resistant House, etc.
 - **River Basin Management**
 - Countermeasure for Sediment Runoff, Old River Course Treatment, Waste Treatment, etc.
 - **Urgent (Short Term) Plan and Long Term Plan**

Long List of Sub-Projects (Tentative)

• Structural Countermeasures

Structural Countermeasure	Upper Tributaries - Accommodating 5 year return period rainfall	River Improvement Works	9 Tributaries	Citarum Upstream
				Citarik Upstream
				Cimande
				Cikijing
				Cikeruh
				Cibeusi
				Cisangkuy Upstream
				Ciputat
				Citalugug
			Other Tributaries	Cirasea
				Cisunnggala, etc.
				Cikeruh
				Cibeusi
				Cimande
				Citalugug, etc.
				Cirasea
				Cisunnggala, etc.
				Citarum Main - Restoration of Convergence (same as "As built during Stage (I) and (II)" - Countermeasures for Land Subsidence - Measures for Excessive Flood (More than 5 RP)
	Retarding Pond			
	Installation of Flood Walls nearby Deyeuh Kolot			
Construction of Dyke nearby Deyeuh Kolot				
Diversion Channel				

Sheet 12

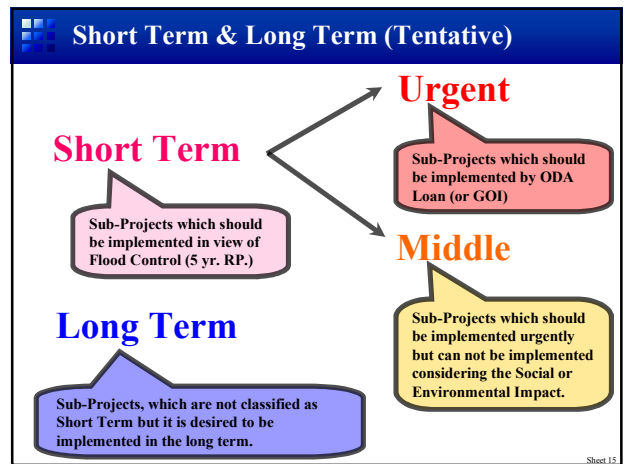
Long List of Sub-Projects (Tentative)

• Non. Str. & River Basin Management

Non-Structural Countermeasures	Flood Plain Management including Soft Component	O & M for Structural Countermeasures
		Installation of Early Warning System
		Preparation of Flood Risk Map and Publication
		Establishment and Strengthening of Flood Fighting Team
		Flood Insurance
		Storehouse of Emergency Supplies
		Raising Public Awareness, Community Discussion
		Disaster Education in Schools
		Disaster Drill
		Land Use Limitation (Limitation of Houses, Agriculture, etc.)
Storage Penetration Measures	Urban Area	Storage and Penetration at individual houses
		Permeable Pavement
	Upstream Recharge Area	Storage at School Yard
		Forest Preservation
River Basin Management	Countermeasure for Sediment Runoff Countermeasure for Land Subsidence Old River Course (Land fill, Environmental Restoration) Water Quality Waste Treatment	Countermeasure for Sediment Runoff
		Countermeasure for Land Subsidence
		Old River Course (Land fill, Environmental Restoration)
		Water Quality
Waste Treatment		

Sheet 13

- ### Selection Criteria of Sub-Projects (Tentative)
- Effectiveness in terms of Flood Control
 - Social Impact (Resettlement & Land Acquisition)
 - Possibilities of Early Implementation
 - Regional Demand
 - Environmental Impact
 - Cost
 - Existence of Detailed Survey Data
- Sheet 14

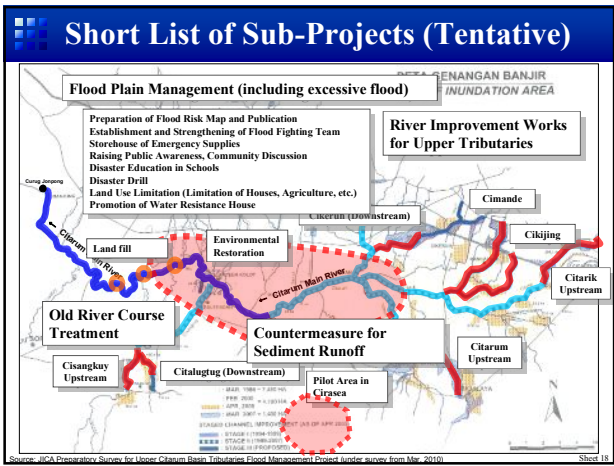


Short List of Sub-Projects (Tentative)

Sub-Projects	Short		Long	No Invlt	
	Urgent	Middle			
Upper Tributaries - Accommodating 5 year return period rainfall	River Improvement Works	9 Tributaries	Citarum Upstream	○	
			Citarik Upstream	○	
			Cimande	○	
			Cikijing	○	
			Cikeruh (Downstream)	○	
			Cikeruh (Upstream)	○	
			Cibeusi	○	
			Cisangkuy Upstream	○	
			Ciputat	○	
		Other Tributaries	Citalugug (Downstream)	○	
			Citalugug (Upstream)	○	
			Cirasea	○	
			Cisunnggala, etc.	○	
			Cikeruh	○	
			Cibeusi	○	
			Cimande	○	
			Citalugug, etc.	○	
			Cirasea	○	
Citarum Main - Restoration of Convergence (same as "As built during Stage (I) and (II)" - Countermeasures for Land Subsidence - Measures for Excessive Flood (More than 5 RP)	Channel Excavation Retarding Pond Installation of Flood Walls nearby Deyeuh Kolot Construction of Dyke nearby Deyeuh Kolot Diversion Channel	Channel Excavation	○ (GOI)		
		Retarding Pond	○		
		Installation of Flood Walls nearby Deyeuh Kolot	○		
		Construction of Dyke nearby Deyeuh Kolot	○		
Diversion Channel	○				

Short List of Sub-Projects (Tentative)

Sub-Projects	Short		Long	No Invlt
	Urgent	Middle		
Non-Structural Countermeasures	Flood Plain Management including Soft Component	O & M for Structural Countermeasures	○ (GOI)	
		Installation of Early Warning System	○	
		Preparation of Flood Risk Map and Publication	○	
		Establishment and Strengthening of Flood Fighting Team	○	
		Flood Insurance	○	
		Storehouse of Emergency Supplies	○	
		Raising Public Awareness, Community Discussion	○	
		Disaster Education in Schools	○	
		Disaster Drill	○	
		Land Use Limitation (Limitation of Houses, Agriculture, etc.)	○	
Storage Penetration Measures	Urban Area	Storage and Penetration at individual houses	○	
		Permeable Pavement	○	
	Upstream Recharge Area	Storage at School Yard	○	
		Forest Preservation	○	
River Basin Management	Countermeasure for Sediment Runoff Countermeasure for Land Subsidence Old River Course (Land fill, Environmental Restoration) Water Quality Waste Treatment	Countermeasure for Sediment Runoff	○	
		Countermeasure for Land Subsidence	○	
		Old River Course (Land fill, Environmental Restoration)	○	
		Water Quality	○	
Waste Treatment	○			



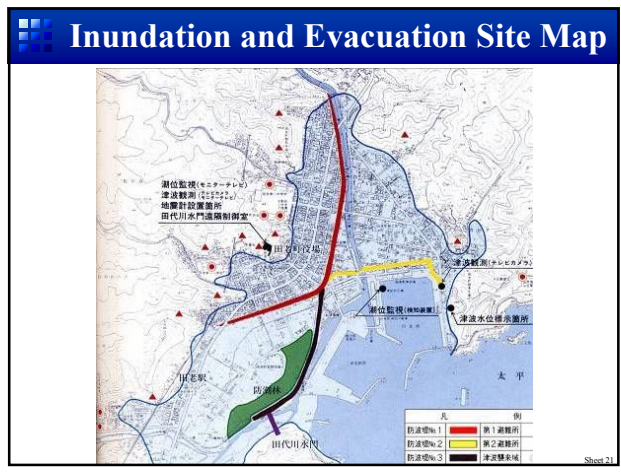
Raising Public Awareness

Pamphlet, Newsletter

- Hazard Map
- How to Prepare
- etc.

Ashiya city, Hyogo pref.

Sheet 19



Managing Storehouse of Emergency Supplies

Contents:
 Fire Extinguisher, Emergency Food, Water, Rescue Kit, Blue Sheet, Tent, Jack, Chainsaw, Temporary Toilet, etc.

Sheet 23

Community Discussion

Slide 24

Disaster Drill

Check an evacuation route

A drill for revival

Slide 25

Physical Measures - Water Resistance House-

2-story house
Main Function of Living is on the 2nd floor
Evacuation Exit on the roof/ 2nd floor

Chapter 4-1-3, "A Review of Water-related Disaster Management" <http://www.mit.go.jp/liver/saigai/kokoku/suiga/suiga.html>

Slide 26

Disaster Education in Schools

For Elementary School Grade 1-3

For Junior-High School

For Elementary School Grade 4-6

For High School

Published by Hyogo Prefectural Education Board

Slide 27

Countermeasures for Sediment Runoff

Small Check Dam

Public Participate

Training

Standard Design of small Check Dam

Retaining bar

Gabion

Slide 28

Old River Course (Oxbow) Treatment


Deteriorated Oxbow

Land-filled Site

Slide 29

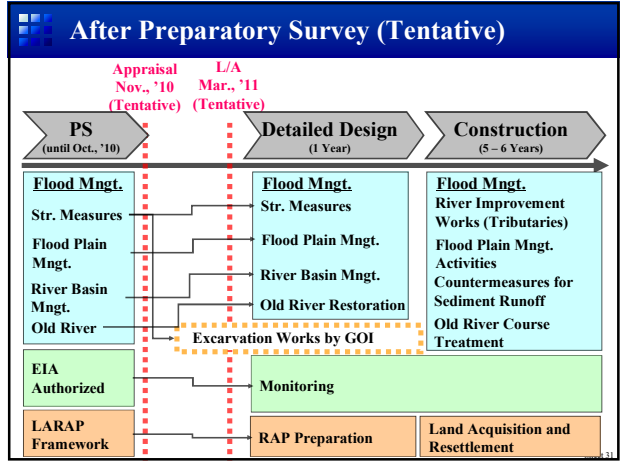
Remaining Tasks of Preparatory Survey

- Hydr. Simulation (Deltares Model, Present Land Use) for Flood Control Plan
- Assistance for EIA preparation
- Assistance for LARAP framework preparation
- Finalizing Selection of Sub-Projects
- Cost Estimation, EIRR, etc.



JICA Appraisal Mission on Nov. (Tentative)

Sheet 30



Terima Kasih

Thank you for your kind attention.

Sheet 32

**3) Presentation during 2nd JICA Fact Finding
Mission (August 25th, 2010)**



JICA Fact Finding Mission for the Rehabilitation of Upper Citarum, Jakarta, 25th of August

Discussion on Selected Sub-Projects for “Rehabilitation of Upper Citarum”

Kenichiro KATO, P.E.,Jp (C.E.) | M.Sc. | M.Eng.

Team Leader
JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project



Draft Profile of “Rehabilitation of Upper Citarum”

- **Location:** Upper Citarum River Basin (1,771km²)
- **Loan Period:** From 2011 to 2017 (7 years)
- **Allocated Loan Budget:** Approx. ¥ 3.7 Billion (JICA Portion)
- **Profile of Components:**
 - **Component A: Structural Countermeasure**
 - Citarum Upstream
 - Cimande
 - Cikijing
 - Cikeruh Downstream
 - **Component B: Non-Structural Countermeasure**
 - Institutional Strengthening for BBWSC
 - Capacity Development for Community against Flood Disaster
 - **Component C: Sediment Control**
 - 266 Check Dams in Cirasea Sub-Watershed

Sheet 1

Background

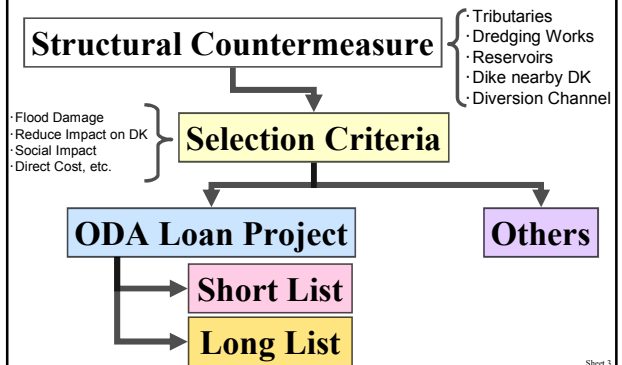
- Due to the JICA Stage (I) & (II) projects, flood has been decreasing along the Citarum main river to some considerable extent.
- Frequent flood disasters in the Upstream Tributaries are still remaining.
- GOI pre-requested ODA Loan Assistance to GOJ for river improvement works of the tributaries in the Upper Citarum Basin as the urgent prioritized project on 30th of June, 2010.

Source: JICA Preparatory Survey Team

Sheet 2

Component A: Structural Countermeasure

Selection of Structural Countermeasure



Sheet 3

Component A: Structural Countermeasure

- **Selection Criteria**
 - Flood Damage
 - Flood Control Effect
 - Impact on Deyeuh Kolot
 - Social Impact
 - Possibility of Early Implementation
 - Environmental Impact
 - Direct Cost ⇒ Total Cost (JICA Portion) < ¥3.7 B.
 - Survey Data Existence

Component A: Structural Countermeasure

Candidate Sub-Project or Countermeasures for Structural Countermeasures	Selection Criteria										Classification of Sub-Project (Countermeasures)			
	Flood Damage Potential (R Rp)	Flood Control Effect (R Rp)	Impact on DK (t)	Social Impact (Hones)	Impact on the selected (Hones)	Possibility of Early Implementation	Regional Demand	Environmental Impact	Direct Cost	Existence of Detailed Survey Data	Long List	Short List	Excluded from Short List by GOI	Countermeasures Others
Upper Tributaries														
Citarum Upstream	126.3	112	6.21	22	3.7	○	○	△	271	○	○	○	○	
Cikaruk Upstream	120.9	720	Slight	7	3.9	○	○	△	40.4	○	○	○	○	○
Cimande	156.4	1,017	Slight	22	11.8	○	○	○	42.5	○	○	○	○	○
Cikijing	513.4	561	Slight	77	7.7	○	○	△	41.7	○	○	○	○	○
Cikeruh	326.6	620	Slight	72	20.7	○	○	△	108.9	○	○	○	○	○
Cirasea	52.4	27	Slight	46	4.9	○	○	○	25.9	○	○	○	○	○
Cikarangkang Upstream	188.1	82	1.67	9	2.2	○	○	△	41.3	○	○	○	○	○
Cikijinging	227.6	87	4.27	47	7.3	○	○	△	72.2	○	○	○	○	○
Cirasea	76.3	27	Slight	4	1.8	○	○	○	4.7	○	○	○	○	○
Cirasea	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cimamanga	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cimande	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cikijing	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cikijinging	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cimamanga	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cimande	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Cikijinging Kolot	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Developing Works for Stage (I) and (II) section														
Citarum Main-1	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Citarum Main-2	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Citarum Main-3	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Construction of dike in the reach of Cimande	○	○	○	○	○	○	○	△	Medium	△	○	○	○	○
Dike on	○	○	○	○	○	○	○	△	Small	△	○	○	○	○
Installation of Flood Walls nearby Deyeuh Kolot														
Construction of Dike nearby Deyeuh Kolot	○	○	○	○	○	○	○	△	Large	△	○	○	○	○
Construction of Dike nearby Deyeuh Kolot	○	○	○	○	○	○	○	△	Large	△	○	○	○	○
Diversion Channel	○	○	○	○	○	○	○	△	Large	△	○	○	○	○

Sheet 5

Component A: Structural Countermeasure

River Improvement	Social Impact Houses to be resettled (Houses)	Direct Cost (B. Rp.)
Citarum Upstream	22	48.0
Cimande	22	43.2
Cikijing	17	58.4
Cikeruh	173	108.9

Direct Cost: 259 Billion Rp.

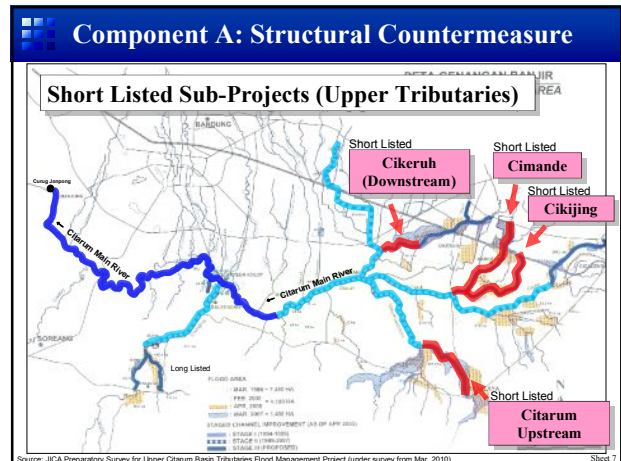
Total Cost: 545 Billion Rp. > 366 B.

Citarum Upstream	22	48.0
Cimande	22	43.2
Cikijing	17	58.4
Cikeruh (Down)	34	34.0

Direct Cost: 184 Billion Rp.

Total Cost: 393 Billion Rp. ≈ 366 B.

Sheet 6

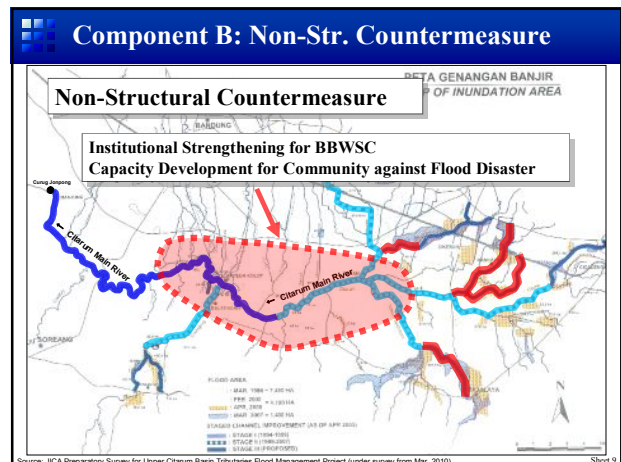


Component A: Structural Countermeasure

Profile of Structural Countermeasure

Tributary	Total Length (m)	Ave. Slope	Design Discharge (m³/s)	Width (m)	Excavation Volume (m³)
Citarum Upstream	5,450	1/1,100-1/750	90	24.5-14.5	191,900
Cimande	9,510	1/4,300-1/1,000	50-35	24.0-18.0	317,000
Cikijing	6,680	1/4,300-1/1,500	20	18.5-15.0	220,900
Cikeruh (Down)	2,500	1/2,800-1/1,500	80	27.8-25.0	109,500

Source: JICA Preliminary Survey for Lower Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010). Sheet 8



- ### Institutional Strengthening for BBWSC
- Implementation Agency**
 - Balai Besar Wilayah Sungai Citarum: BBWSC
 - Activity**
 - Institutional Strengthening for Early Warning System (EWS)**
 - Strengthening of the existing Automated Water Level System (AWLS) for Early Warning
 - Strengthening of Information Network System connecting Upper, Middle and Down in Citarum River Basin
 - Strengthening Early Warning Communication System (PUSAIR, Kab., Kota, BPBD, Community)
 - Data Storage and Data Accumulation for Reliable Early Warning System, etc.
 - Strengthening for Operation & Maintenance (O&M)**
 - Regular Monitoring for River Structure
 - Regular Dredging as ordinal O&M activity, etc.
- Sheet 10

- ### Capacity Development for Community against Flood Disaster
- Implementation Agency**
 - BBWSC in associated with Community (Desa), Kab. Bandung and PUSAIR
 - Purpose**
 - Coping Capacity against Flood Disaster will be strengthened or developed at community level.
 - Activity**
 - Application of Flood Hazard Mapping prepared by ADB project
 - Reinforcement of Desa activity (LMD) through BBWSC supports (Temporary Flood Wall, Sand bag, Commodity, etc.)
 - Community discussion forum
 - Prevention education in school, Evacuation Drill, etc.
 - Outputs**
 - The following capacity will be raised through the activities.
 - Establishment of Information flow network involving communities
 - Enhancement of Flood fighting capacity
 - Evacuation, etc.
- Sheet 11

Location of Oxbow

18 Oxbows (Old river course) along Citarum Main between Nanjung and Sapan

Sheet 18

Old River Course (Oxbow) Treatment

Deteriorated Oxbow → Environmental Restoration

Sheet 19

Consulting Services

Component A: Structural Countermeasure

- Review of the existing study and detailed design
- Review of pre-qualification and bid documents
- Assistance of bidding and contracting
- Assistance in construction supervision
- Transfer of knowledge to counterpart personnel
- Reporting

Component B: Non Str. Countermeasure

- Institutional Strengthening for BBWSC
- Capacity Development for Community against Flood Disaster
- Supervising of NGO Activity

Component C: Sediment Control

- Detailed Design
- Assistance for Project dissemination at Desa
- Assistance for Local Project Planning and Financing
- Assistance for Yearly review of Participatory LRSC Activities
- Supervision of Participatory LRSC Activities
- Supervising of NGO Activity

Terima Kasih

Thank you for your kind attention.

Sheet 21

**4) Presentation during 2nd Workshop (October
5th, 2010)**



2nd Flood Management Workshop "Selection of Urgent Flood Mitigation Works in the Upper Citarum River Basin", Bandung, Oct. 5th, 2010

Activities of JICA Preparatory Survey Team and Profile of ODA Loan Project in Upper Citarum River Basin

Kenichiro KATO, P.E., Jp (C.E.) | M.Sc. | M.Eng.

Team Leader
JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project



Contents

1. Activity of JICA Preparatory Survey
2. Profile of Proposed ODA Loan Project
3. Water related Issues in the Upper Citarum River Basin

Sheet 1



1. Activity of JICA Preparatory Survey

Sheet 2



Background

- Stage (I) (1994-1999)
- Stage (II) (1999-2007)



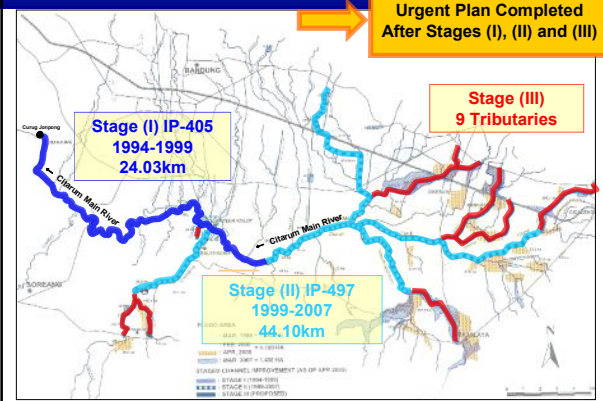
Review of Flood Control Plan and Detailed Design Preparation in 2007 (2007 D/D)

2008 Blue Book as "Rehabilitation of 9 (nine) Citarum Tributaries (Cikeruh, Cibeusi, Cikijing, Cimande, Citarik Upstream, Citarum Upstream, Cisangkuy Upstream, Citalugtug, Ciputat)

Sheet 3

Background

Urgent Plan Completed After Stages (I), (II) and (III)

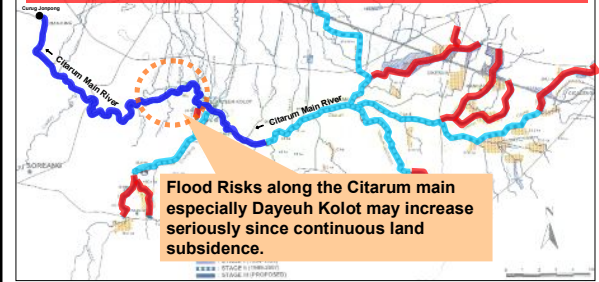


Sheet 4



Background

If river improvement works of the nine tributaries will be implemented, flood risks along the nine tributaries will decrease. It results that peak discharge into the Citarum main river may increase.



Sheet 5

Background

- **9 Tributaries Improvements based on 2007 D/D**
 - Increase of peak discharge into the Citarum Main River
 - Flood Risks along the Citarum main especially Dayeuh Kolot may increase seriously since continuous land subsidence.

↓

- **JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project**
 - Necessity to reduce impact on the Citarum Main River
 - Review of 2007 D/D

Sheet 6

Objectives of Preparatory Survey (PS)

- **Formulation of JICA ODA loan project to minimize flood damage occurrence**
- **Proposition of technical assistance for improving water-related issues**

Sheet 7

Scope of Preparatory Survey (PS)

1. **Review of the background and necessity of the Project**
2. **Review of the Feasibility of the Project**
3. **Identify other issues of concern and propose necessary countermeasures for identified concerns**
4. **Evaluation of the Project Implementation and O&M Framework**
5. **Evaluation of the Benefit of the Project**
6. **Assessment of the Environmental and Social Considerations**

Sheet 8

PS Schedule

We are here. (Oct 5th)

Year	2010							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Month	1	2	3	4	5	6	7	8
Work in Indonesia		██████████				██████████		█
		Deltares – Delft Hydraulics (Simulation)						
		██████████						
		RayaKonsult (Leveling, Env.)						
Work in Japan	□			□			□	□
Report	△			△			△	△
	ICR			IR			DFR	FR

ICR:Inception Repor, IR: Interim Report, DFR:Draft Final Report, FR:Final Report

Sheet 9

Flood Control Plan based on Simulation Model Analysis

Sheet 10

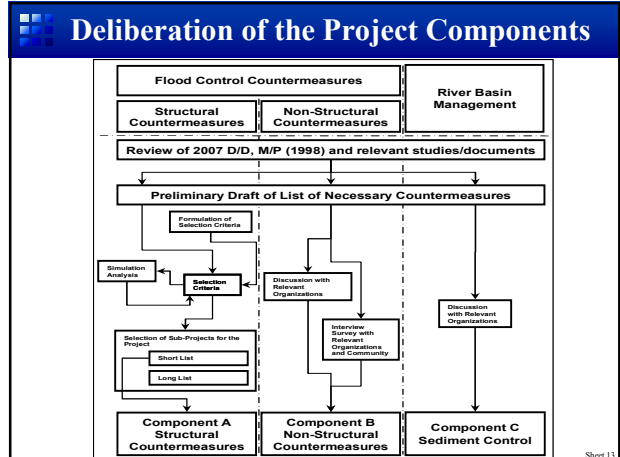
2. Profile of Proposed ODA Loan Project

Sheet 11

Profile of "Rehabilitation of Upper Citarum"

- **Location:** Upper Citarum River Basin (1,771km²)
- **Loan Period:** From 2011 to 2017 (7 years)
- **Allocated Loan Budget:** Approx. ¥ 3.7 Billion (JICA Portion)
- **Profile of Components:**
 - **Component A: Structural Countermeasure**
 - Citarum Upstream (L=5.45km)
 - Cimande (L=9.51km)
 - Cikijing (L=6.68km)
 - Cikeruh Downstream (L=2.50km)
 - Feasibility Study for Dayeuh Kolot
 - **Component B: Non-Structural Countermeasure**
 - Institutional Strengthening for BBWSC
 - Capacity Development for Community against Flood Disaster
 - **Component C: Sediment Control**
 - 266 Check Dams in Cirasea Sub-Watershed

Sheet 12



Candidate Sub-Projects for Component A

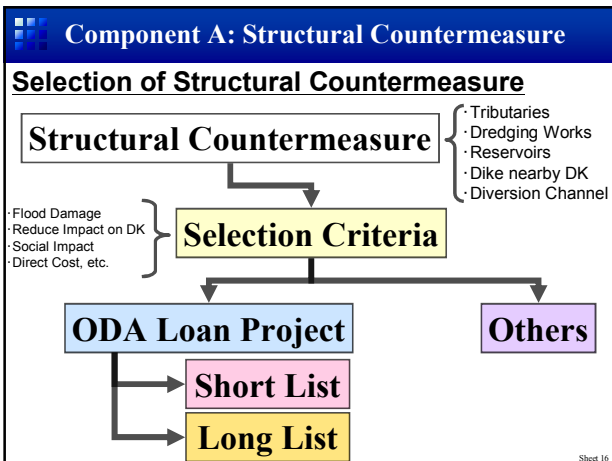
Candidate Sub-Project or Countermeasures for Flood Control Countermeasures (Structural Countermeasures)			
Structural Countermeasures	Upper Tributaries	River Improvement Works	9 Tributaries
			Other Tributaries
			Citarum Upstream
			Citarik Upstream
			Cimande
			Cikijing
			Cikeruh
			Cibeusi
			Cisangkuy Upstream
			Citalingting
			Ciputat
			Cirasea
			Cisumgala
			Cibodas
			Cicadas
			Cidurian
			Cikapundung
			Cinambo
			Citopus
			Cikapundung Kolot
			Dredging Works for the Completed Sections during Stage (I) and (II)
			Citarum Main -1
			Citarum Main -2
			Citarum Main -3
			Citarik -1 (after the confl. of Cimande)
			Oxhow
			Installation of Flood Walls nearby Dayeuh Kolot
			Construction of Dyke nearby Dayeuh Kolot
			Diversion Channel

Sheet 14

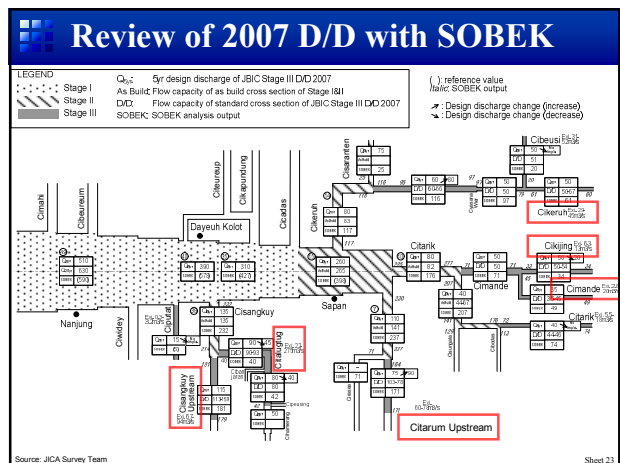
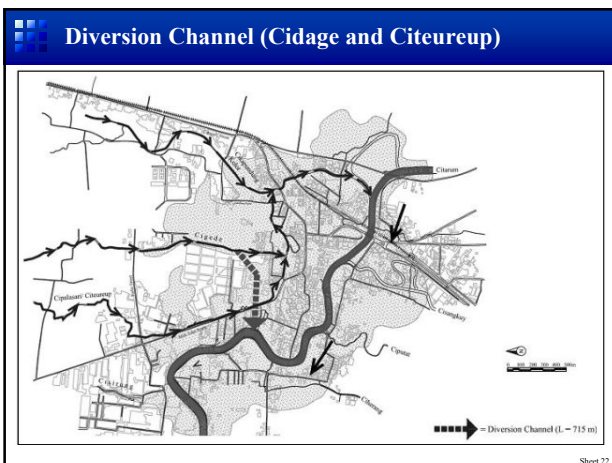
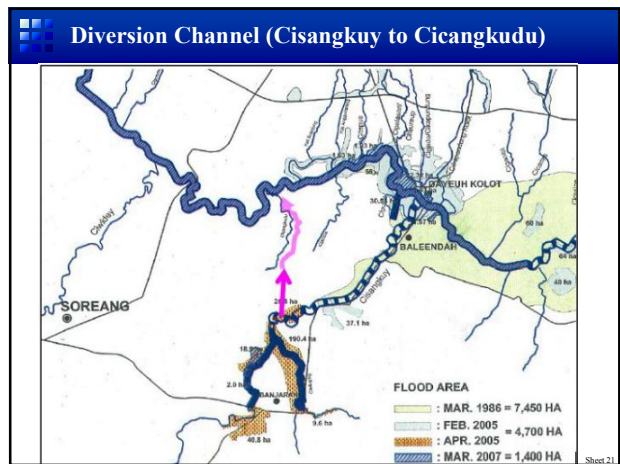
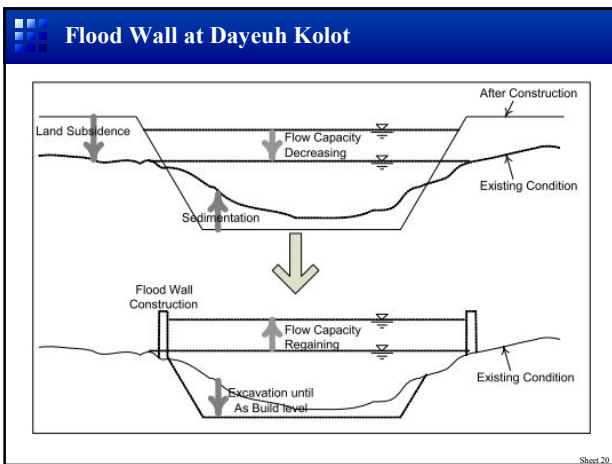
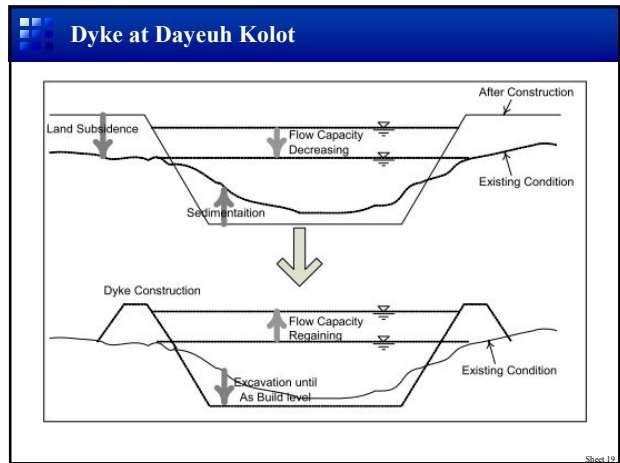
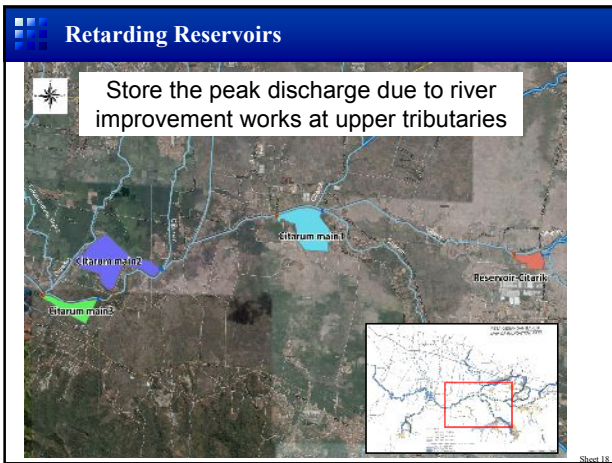
Component A: Structural Countermeasure

Candidate Sub-Project or Countermeasures as Flood Control Countermeasures (Structural Countermeasures)			Dimension	Necessary Countermeasures	Classification of Sub-Project Next ODA Loan	
Structural Countermeasures	Upper Tributaries	River Improvement Works			Long List	Short List
			Citarum Upstream	L=5.450m	○	○
			Citarik Upstream	L=4.820m	○	○
			Cimande	L=9.510m	○	○
			Cikijing	L=6.680m	○	○
			Cikeruh (downstream)	L=2.500m	○	○
			Cikeruh (upstream)	L=5.150m	○	○
			Cibeusi	L=1.360m	○	○
			Cisangkuy Upstream	L=3.730m	○	○
			Citalingting	L=4.010m	○	○
			Ciputat	L=660m	○	○
			Cirasea	-	○	○
			Cisumgala	-	○	○
			Cibodas	-	○	○
			Cicadas	-	○	○
			Cidurian	-	○	○
			Cikapundung	-	○	○
			Cinambo	-	○	○
			Citopus	-	○	○
			Cikapundung Kolot	-	○	○
			Dredging Works for the Completed Sections during Stage (I) and (II)	-	○	○
			Citarum Main -1	A=331,000m ²	○	○
			Citarum Main -2	A=1,021,000m ²	○	○
			Citarum Main -3	A=760,600m ²	○	○
			Citarik -1 (after the confl. of Cimande)	A=175,000m ²	○	○
			Oxhow	A=43,193m ²	○	○
			Installation of Flood Walls nearby Dayeuh Kolot	-	○	○
			Construction of Dyke nearby Dayeuh Kolot	-	○	○
			Diversion Channel	-	○	○

Sheet 15



- ## Component A: Structural Countermeasure
- **Selection Criteria**
 - Flood Damage Potential
 - Flood Control Effect
 - Impact on Dayeuh Kolot
 - Social Impact (Land Acquisition and Resettlement)
 - Possibility of Early Implementation
 - Regional Demand
 - Environmental Impact
 - Direct Cost ⇒ Total Cost (JICA Portion) < ¥3.7 B.
 - Survey Data Existence
- Sheet 17



Component A: Structural Countermeasure

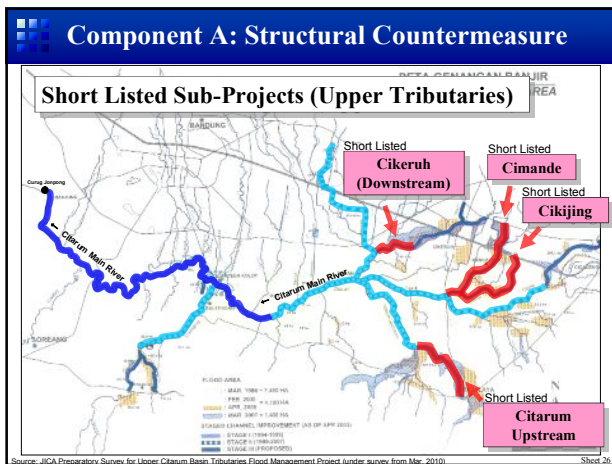
Tributary	Short List	Length m	Flood damage Potential	Flood control effect	Impact on DK	Direct cost	Social impact
			Rp. Billion	Rp. Billion	-	Rp. Billion	Houses to be relocated
Citarum Upstream	○	5,450	1,063	112	0.21	44.8	34
Cimande	○	9,510	196	1,147	Slight	44.5	16
Cikijing	○	6,680	513	563	Slight	44.0	40
Cikeruh (up to 2.5km)	○	2,500	-	-	-	21.9	34
Cikeruh (upstream)	-	5,150	557	626	Slight	77.7	156
Cikeruh (whok revier)	-	7,650	-	-	-	99.6	190
Cisangkuy Upstream	-	3,730	188	82	1.67	40.3	25
Citaluguy	-	4,010	258	65	0.24	51.5	64

Flood Damage Potential: It indicates flood damage potential based on the total amount of property in flood area of '86, '05, '06, '07 and '10.
Flood Control Effect: This indicator shows the potential flood damage reduction amount due to the river improvement works for 5 years return period flood.
Impact on Dayah Kotok: Ratio between increased discharge due to tributary improvement works and downstream river storage capacity.
Direct Cost: Total cost shall be lower than Rp 3.7 Billion (666 Billion Rupiah).
Social Impact (Houses to be relocated): If it is more than 40 houses (equivalent to 200 people) for a sub-project, early implementation of the sub-project can not be carried out because it is regarded as large resettlement based on the application practice of UP 4.12 of WB guideline.

Component A: Structural Countermeasure

River Improvement	Social Impact		Direct Cost (B. Rp.)
	Houses to be resettled (Houses)		
Citarum Upstream	22	48.0	Direct Cost: 259 Billion Rp. Total Cost: 545 Billion Rp. > 366 B.
Cimande	22	43.2	
Cikijing	17	58.4	
Cikeruh	173	108.9	
Cikeruh (Down)	34	34.0	

Citarum Upstream	22	48.0	Direct Cost: 184 Billion Rp. Total Cost: 393 Billion Rp. ≈ 366 B.
Cimande	22	43.2	
Cikijing	17	58.4	
Cikeruh (Down)	34	34.0	
Cikeruh (Upstream)	173	108.9	

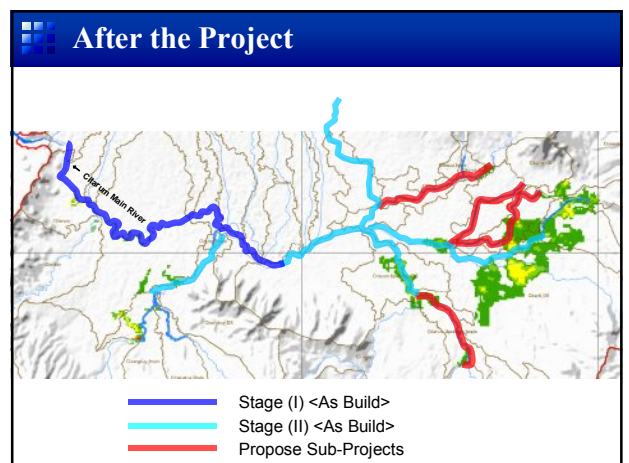
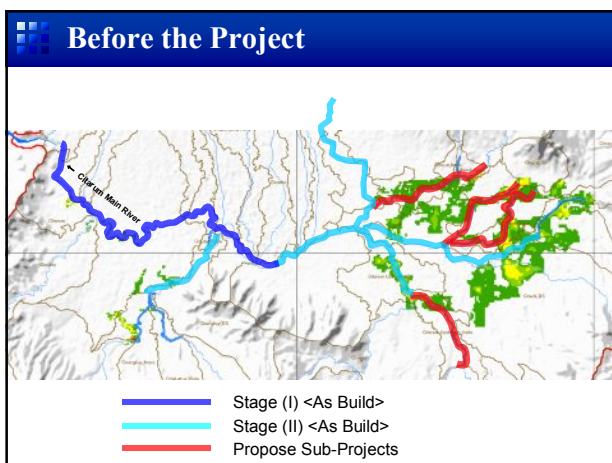


Component A: Structural Countermeasure

Profile of Structural Countermeasure

Tributary	Total Length (m)	Ave. Slope	Design Discharge (m ³ /s)	Width (m)	Excavation Volume (m ³)
Citarum Upstream	5,450	1/1,100-1/750	90	24.5-14.5	191,900
Cimande	9,510	1/4,300-1/1,000	50-35	24.0-18.0	317,000
Cikijing	6,680	1/4,300-1/1,500	20	18.5-15.0	220,900
Cikeruh (Down)	2,500	1/2,800-1/1,500	80	27.8-25.0	109,500

Source: JICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010).



Component B: Non-Str. Countermeasure

Non-Structural Countermeasure

**Institutional Strengthening for BBWSC
Capacity Development for Community against Flood Disaster**

Source: ICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010). Sheet 30

Institutional Strengthening for BBWSC

- **Implementation Agency**
 - Balai Besar Wilayah Sungai Citarum: BBWSC
- **Activity**
 - Institutional Strengthening for Early Warning System (EWS)
 - Strengthening of the existing Automated Water Level System (AWLS) for Early Warning
 - Strengthening of Information Network System connecting Upper, Middle and Down in Citarum River Basin
 - Strengthening Early Warning Communication System (PUSAIR, Kab., Kota, BPBD, Community)
 - Data Storage and Data Accumulation for Reliable Early Warning System, etc.
 - Strengthening for Operation & Maintenance (O&M)
 - Regular Monitoring for River Structure
 - Regular Dredging as ordinal O&M activity, etc.

Sheet 31

Capacity Development for Community against Flood Disaster

- **Implementation Agency**
 - BBWSC in associated with Community (Desa), Kab. Bandung and PUSAIR
- **Purpose**
 - Coping Capacity against Flood Disaster will be strengthened or developed at community level.
- **Activity**
 - Application of Flood Hazard Mapping prepared by ADB project
 - Reinforcement of Desa activity (LMD) through BBWSC supports (Temporary Flood Wall, Sand bag, Commodity, etc.)
 - Community discussion forum
 - Prevention education in school, Evacuation Drill, etc.
- **Outputs**
 - The following capacity will be raised through the activities.
 - Establishment of Information flow network involving communities
 - Enhancement of Flood fighting capacity
 - Evacuation, etc.

Sheet 32

Component C: Sediment Control

Countermeasure for Sediment Control

Pilot Area in Cirasea Sub-Watershed

266 Check Dams

Source: ICA Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project (under survey from Mar. 2010). Sheet 33

Component C: Sediment Control

- **Check Dam (5 units)**
- **Public Participation**
- **Small Check Dam (261 units)**
- **Training**

Sheet 34

Component C: Sediment Control

- **Empowerment for the People at Community Level**
 - Raising awareness of the necessity for improved environmental management
 - Raising of the sense of ownership
 - Emphasizes the use of local resources for peoples' welfare
 - Active community participation by people in the project process
 - Investigation, analysis, implementation planning,
 - Decision-making and monitoring and evaluation

Sheet 35

Component C: Sediment Control

- **Institutional Arrangements for the Implementation of Component C**
 - Due to the participatory implementation and bottom-up concept, utilization of human resource of Kabupaten Dinas will be effective way for smooth implementation of the Component. In this case institutional arrangement among Central, BBWSC, and Kabupaten will be mandatory.

Consulting Services

- **Component A: Structural Countermeasure**
 - Review of the existing study and detailed design
 - Review of pre-qualification and bid documents
 - Assistance of bidding and contracting
 - Assistance in construction supervision
 - Transfer of knowledge to counterpart personnel
 - Reporting
- **Component B: Non Str. Countermeasure**
 - Institutional Strengthening for BBWSC
 - Capacity Development for Community against Flood Disaster
 - Supervising of NGO Activity
- **Component C: Sediment Control**
 - Detailed Design
 - Assistance for Project dissemination at Desa
 - Assistance for Local Project Planning and Financing
 - Assistance for Yearly review of Participatory LRSC Activities
 - Supervision of Participatory LRSC Activities
 - Supervising of NGO Activity

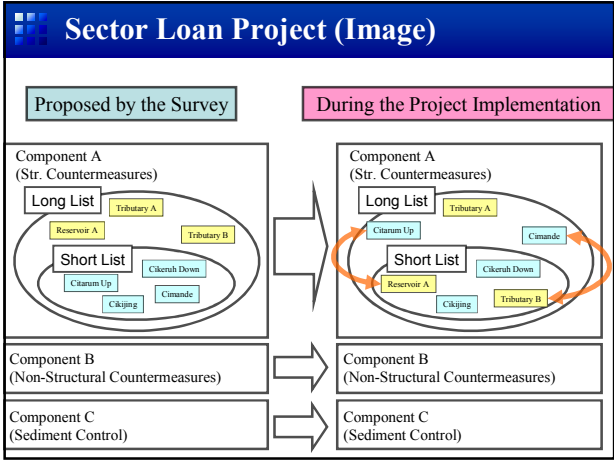
Profile of “Rehabilitation of Upper Citarum”

- **Location: Upper Citarum River Basin (1,771km²)**
- **Loan Period: From 2011 to 2017 (7 years)**
- **Allocated Loan Budget: Approx. ¥ 3.7 Billion (JICA Portion)**
- **Profile of Components:**
 - **Component A: Structural Countermeasure**
 - Citarum Upstream (L=5.45km)
 - Cimande (L=9.51km)
 - Cikijing (L=6.68km)
 - Cikeruh Downstream (L=2.50km)
 - Feasibility Study for Dayeuh Kolot
 - **Component B: Non-Structural Countermeasure**
 - Institutional Strengthening for BBWSC
 - Capacity Development for Community against Flood Disaster
 - **Component C: Sediment Control**
 - 266 Check Dams in Cirasea Sub-Watershed

Implementation Schedule

Project Implementation: From 2011 to 2017

Description	Tentative Project Implementation Schedule						
	2011	2012	2013	2014	2015	2016	2017
Pledge	[Gantt bar: 2011-2011]						
Conclusion of Loan Agreement	[Gantt bar: 2011-2011]						
Preparation and Finalization of RAP	[Gantt bar: 2011-2012]						
Compensation Payment and Relocation	[Gantt bar: 2012-2015]						
Selection of Consultants	[Gantt bar: 2011-2012]						
Review and Additional Design/Study	[Gantt bar: 2012-2013]						
Pre-qualification and Tender	[Gantt bar: 2012-2013]						
Structural Countermeasures	[Gantt bar: 2013-2017]						
Non-Structural Countermeasures	[Gantt bar: 2012-2017]						
Sediment Control	[Gantt bar: 2012-2017]						



3. Water related Issues in the Upper Citarum River Basin

Water related Issues in the Upper Citarum River Basin

- **Flood Problems**
- **Land Subsidence**
- **Sediment Runoff**
- **Waste & Garbage Runoff**
- **Water Quality**
- **Degradation of Environment, etc.**

Sheet 42

Land Subsidence

1.75m subsided from 1996 to 2005 (at the rate of 15cm to 20cm)

Continuous Land Subsidence at the rate of 12cm/year

Source: Review of Flood Control Plan and Detailed Design Preparation under Stage (I) (2007)

Sheet 43

Land Subsidence

Spatial Distribution of Subsidence Annual Average, 1994-2009

Source: UCSFM, ICWRMP, ADB (2010)

Sheet 44

Sediment Runoff

Cultivation in Agricultural Area, Population Pressure and might cause deterioration of Mountainous Area

Cultivation in steep terrain **Forrest Collapse**

Sheet 45

Sediment Deposition

SAPAN

EL., m

— AS BUILT during Stage (II)
— EXISTING

Nov. 2009 at Dayeuh Kolot Bridge

Sediment Deposition

Stage (I) and (II) Existing **Stage (I) and (II) As build**

Ordinal Dredging as O&M is indispensable.

Waste & Garbage Runoff



Picture 1:
Waste or Garbage accumulated alongside of river bank



Picture 2:
Clogged Ditch along road (Majalaya)

Source: 1) A Story & Photos from Upstream – CITARUM RIVER
2) Picture taken by a survey team member of JICA Preparatory Study (Feb. 2010)


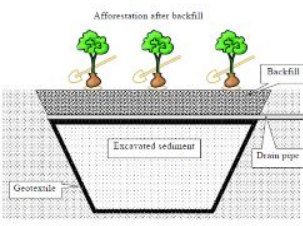
Sheet 48

Deteriorated Oxbow

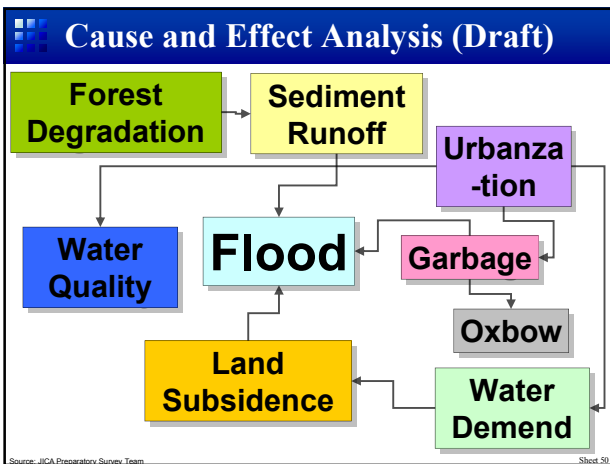
Deteriorated Oxbow

➔

Environmental Restoration

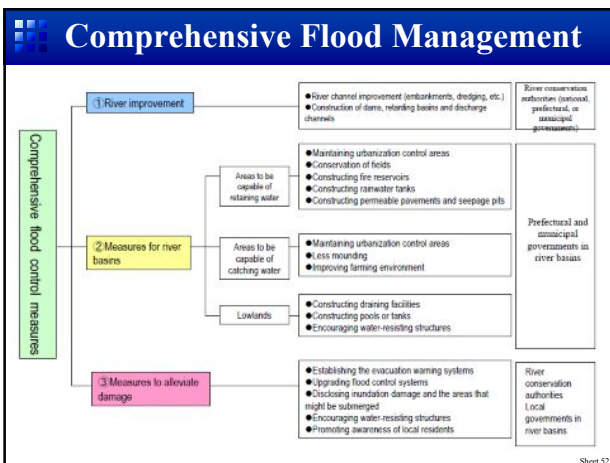
Sheet 49



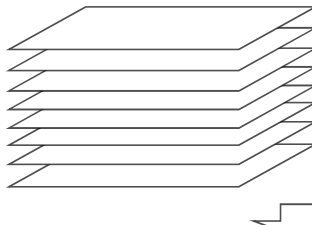
Issues and Technical Cooperation related flood (Tentative Draft only)

	Issues	Technical Assistance
River basin management	There are many issues related to water such as flood, land subsidence, heavy metal, sediment discharge, water quality and waste etc. These issues are intricately intertwined and each measure is not the fundamental solution for these issues.	<ul style="list-style-type: none"> Comprehensive assistance for technical cooperation programs toward overall solutions on the river basin issues
Land subsidence	In the area of Dayeun Kolot, the land subsidence due to the dipping up of the groundwater seriously causes the damage of the infrastructure facilities such as crack of the roads and subsidence of the houses. This land subsidence is one of the main factors for flood damages in Dayeun Kolot occurred in 2005. The progress of the land subsidence increases the risk of flood damages.	<ul style="list-style-type: none"> According to the groundwater management, the cultivation of groundwater, utilizing retention ponds mitigates the land subsidence Recommend the goal of groundwater maintenance, and set up the indicators for monitoring, maintenance of water quantity and quality, prevention of the land subsidence, assistance of groundwater maintenance and development activities
Sediment runoff	In the mountain area of Citarum river, the sediment discharge is one of the significant issues. JICA loan project "The Upland Plantation and Land Development Project at Citirik Subwatershed" was implemented. However some sediment has still been there. The sediment discharge from upstream causes the reduction of conveyance function and the increase of flood risk. The decrease on the capacity of dam in the downstream due to the sediment is also considered seriously.	<ul style="list-style-type: none"> Restraint of the sediment discharge and cultivation measures of rivehead with the participation of residents which was implemented in "The Upland Plantation and Land Development Project at Citirik Subwatershed" are conducted in other mountain areas.
Water quality	Some parts of Development on the public sewerages in Bandung are implemented. In fact, most waste water is discharged to rivers. Considered the environment development in river basin and each kind of water utilization in the downstream such as power generation water, agricultural water and water source for Jakarta, the development of water quality is necessary.	<ul style="list-style-type: none"> In order to maintain the waste quality, the prevention against inflow of waste and enhancement of regulation for waste water of factories are assisted In order to maintain the river environment with good conditions, and prevent the impacts on the agriculture in the downstream dam like, development measures the water quality including the development of sewerage are considered
Waste/Garbage	There are the collecting systems by the garbage trucks, however the capacity of the collection is not enough for the amount of waste. As the result, the wastes are discharged into rivers. In the area of Dayeun Kolot, when excavating the rivehead, large quantities of wastes are mixed. In the urban areas, due to the accumulation of garbage, the function of conveyance is decreased.	<ul style="list-style-type: none"> Consider the measures to prevent against the inflow of waste, conserve the river environment and maintain the function of river flow. Plan the capacity development on waste disposal not to inflow the wastes into river and enhancement of systems.

Sheet 51



Water Master Plan for the Upper Citarum River Basin



Flood Problems
Land Subsidence
Sediment Runoff
Waste & Garbage Runoff
Water Quality
Degradation of Environment, etc.

Formulation of Water Master Plan for the Upper Citarum River Basin

Sheet 53

Water Master Plan for the Upper Citarum River Basin

Tsurumi River Basin Water Master Plan

The Tsurumi River Basin Subcommittee was established in February 2002 to promote the adoption of this plan.

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    graph TD
      Gov[Government] --> Acad[Academic]
      Gov --> NPO[NPO]
      Acad <--> NPO
    
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Keihin River Office

Sheet 54

Tsurumi River Multipurpose Retarding Basin

Sheet 55

JICA future T/A taking the Road Map into account

CITARUM ROADMAP FINANCING

Estimated cost to financing Intervention Activities Citarum Roadmap

35 intervention activities will be funded by the ICWRMIP

Other funding resources; Government (APBN&APBD), Private sectors, other donors (JICA, WB, IDB, UNDP...)

Funding is still required

Close Coordination with JICA

Source: Study Group for Joint Study of CITARUM National Steering Committee on Water Resources - Citarum Planning Coordination Meeting (April, 2005) Sheet 56

Terima Kasih

- Thank you very much for your attention.

Sheet 57