

Environmental Assessment Report

Summary Initial Environmental Examination
Project Number: 37049
December 2006

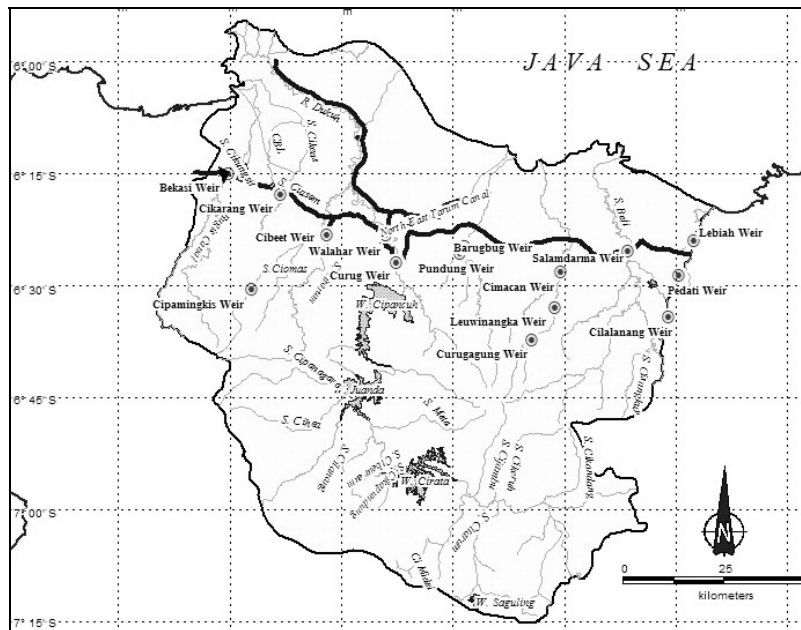
Indonesia: Integrated Water Resources Management Program

Prepared by Directorate General for Water Resources, Ministry of Public Works for the Asian Development Bank (ADB).

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*Integrated Citarum Water Resources Management Program (ICWRMP)
(ADB TA4381-INO Phase III)*

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION (IEE)
OF TRANCHE 1



6 December 2006

SUMMARY INITIAL ENVIRONMENTAL ASSESSMENT OF TRANCHE 1 UNDER THE INTEGRATED CITARUM WATER RESOURCES MANAGEMENT PROGRAM (ICWRMP)

I. INTRODUCTION

1. ICWRMP is a 15-year program supported by ADB's Multi-tranche Financing Facility (MFF). It is designed to address the multiple and inter-related concerns of water supply sustainability and water quality degradation in the Citarum basin which supplies 80% of Jakarta's water needs. Inadequate institutional arrangements, deteriorating infrastructure, competing water demands, and rapid urban and industrial growth have led to water supply shortages and unhealthy environmental conditions throughout the basin.

2. With assistance from ADB, the Ministry of Public Works - Directorate General for Water Resources has prepared a strategic plan for managing the Citarum basin. Known as the "roadmap", this is to serve as the government's overall basin plan. It identifies a comprehensive list of possible interventions throughout the basin. Priority projects are proposed for inclusion under Tranche 1 of a Multi-tranche Financing Facility (MFF) provided by ADB.

II. TRANCHE 1 PROJECTS DESCRIPTION

3. The goal is sustainable management of water resources for economic and social development. The immediate objective for the 5-year Tranche 1 projects package is to improve water availability and capacity for integrated water resources management in the Citarum basin. Projects included in Tranche 1 are summarized below.

Project and Location	Thrust	Main Activities
Institutional Strengthening for IWRM (Basin wide)	Will address current institutional arrangements that are characterized by highly sectoral divisions of work and lack of coordination, as well as weak enforcement despite the fact that regulatory frameworks and standards are generally in place (e.g. for pollution control).	<ul style="list-style-type: none"> • Capacity Building and Support • Data and Modeling • "State-of-the-Basin" Reporting • Basin Planning
Water Supply Options and Improved Groundwater Management (Upper basin Bandung region)	Focuses on development of water supply options for Bandung, specifically to address the over-dependence on groundwater. Envisioned approach is through conjunctive management of groundwater and surface water supply, in particular the provision of alternative surface water source for industries currently mining the area's deep groundwater on a large scale.	<ul style="list-style-type: none"> • Options for Increase in Surface Water Supplies • Improved implementation of regulations for sustainable groundwater management in Bandung • Improvements to groundwater monitoring network • Establishment of, and ongoing support for, a stakeholder forum for Bandung under the basin council
Rehabilitation of the West Tarum Canal (Lower basin)	Will improve the structural condition and conveyance capacity of the canal. Involves removal of accumulated sediment deposits, raising and strengthening embankments in some segments to prevent breaching and flooding of low-lying areas, control of household waste disposal into the canal, control over illegal construction and commercial activities within the canal easement, and preventing polluted water from entering the canal at the river crossings through construction of bypass/siphon at Bekasi.	<ul style="list-style-type: none"> • Detailed Engineering Design • Tendering • Construction of Improvement Works
Roll-Out of System Rice Intensification, SRI (Upper basin)	Project is aimed at water conservation. As shown by experience in Japan, SRI has potential to increase yield and at the same time reduce water demand significantly by up to 40%.	<ul style="list-style-type: none"> • Appraisal of Target Areas • Capacity Building • Progressive implementation of SRI
Community-driven Initiatives for Improved	This component is complementary to the WTC rehabilitation. It will provide alternatives to	<ul style="list-style-type: none"> • Capacity Building and Planning • Implementation and Ongoing Support

Project and Location	Thrust	Main Activities
Water and Catchment Management (Riverside communities in upper and lower basin)	communities living along the canal in dealing with waste disposal, currently a cause of water quality degradation in the canal.	
Basin Water Quality Improvement Strategy and Action Plans (Basin wide)	Particularly for the areas with high density of industries (notably Bandung and Bekasi), an area action plan would be drawn up to more effectively deal with pollution problems at the source. Such plans would be oriented around combination of strategies that involve expansion of cooperation schemes under PROKASIH PROPER, strengthening of regulatory (command-and-control) systems, and use of incentives.	<ul style="list-style-type: none"> • Policies and Procedures for Water Quality Management • Improvements to Water Quality Monitoring and Data Management • Development of Organizational Capacity • Preparation of Basin-Wide River Quality Improvement Strategy • Preparation and Implementation of Area-Based Pollution Sources • Management Action Plans
Productive Reforestation of Degraded Catchments and Protected Area Management for Biodiversity Protection (Upper basin)	Re-greening of watersheds would be planned so as to provide the best long-term possibility to protect the water resource quality and quantity, at the same time helping restore other landscape ecological functions.	<ul style="list-style-type: none"> • Spatial planning for reforestation • Village action plans for reforestation • Institutional development • Improvement of village land tenure arrangements • Alternative livelihoods for displaced upland forest villagers • Data gathering, investigations and action planning • Implementation

II. DESCRIPTION OF THE ENVIRONMENT

A. Physical Setting and Land Use

4. The program area, located on Java Island and covering a total of about 13,000 km², is a cluster of river basins consisting of: (i) the 6,600 km² Citarum river basin which straddles the central part of the program area and flows from south to north into the Java Sea; (ii) the 4,400 km² cluster of small basins whose drainage areas are connected to the Citarum river system through the East Tarum Canal; and (iii) the Cikarang and Bekasi rivers, with a combined drainage area of 2,000 km² which are also connected with the Citarum river through the West Tarum Canal. Together, these inter-connected river basins make up the SWS Citarum (program area).

5. The area is a key rice producer for the country. There are a total of 390,000 ha of irrigated paddies, with 240,000 ha served by the Juanda reservoir and canal system in the lower basin. Land devoted to rice production make up nearly half (47.5%) of the program area, with 70% of these fully irrigated. Rainfed areas cover 43,000 ha, or only about 10% of the land use. Also within the program area are three large dams that generate a total of 1,400 megawatts, and major industries centered at Bandung and the rapidly urbanizing corridor east of Jakarta (Bekasi-Cikarang).

6. In the upper Citarum basin, hilly land farming is pervasive and many farmers still prefer to plant vegetables and annual crops that do not provide adequate cover and protection from soil erosion. Expansion of upland farming areas (which increased by 31,000 ha from 1992 to 2001) is taking place at the expense of the forest. Forest areas in the upper Citarum have declined from 35,000 ha in 1992 to 19,000 ha in 2001. Remaining forests cover only about 10.2% of the program area, far less than the 30% mandated in the 1999 national forestry law.

B. Water Resources

7. The three cascading reservoirs (Saguling, Cirata and Jatiluhur) were built to regulate flows, provide hydropower, and store/supply water for irrigation, industrial and domestic uses. They also trap sediments. The rate at which sediments are being deposited in the reservoirs is rapidly reducing storage capacity and shortening their useful life.

8. Inflow into the reservoir system has been decreasing. Between 1986 and 1991, dry season flow into the Saguling reservoir was 38% of the average annual flow. This went down to 36% between 1992 and 1997, and declined further to 34% starting in 1998. Watershed degradation is the principal cause. Denuded catchments have reduced capacity to capture rainwater, resulting in high peak flows during the rainy months. In turn, lower water retention capacity has reduced the amount of water available for release as “base flow” during the summer months. In 2005, the Jatiluhur irrigation system failed to meet water demand for 5 months.

9. In Bandung, an estimated 90% of the population and 98% of the industries rely on groundwater. Groundwater levels have declined by 5 meters per year in some places. The cumulative water level decline since 1920 has been 85 m. Land subsidence has reached 0.8 m in some areas, resulting to increased vulnerability to flooding. Industrial groundwater abstraction in Bandung has also had a devastating effect on shallow wells on which numerous households depend. Pollution due to inadequately treated industrial wastewater has caused deterioration in the water quality of shallow wells and rivers.

10. Flooding is a result of changes in the river flow regime, in turn caused by watershed denudation. Flood peaks have increased. The ratio of wet season peak flows to dry season low flows in the upper basin has increased from 3.4 in 1992 to 7.3 in 2003. The increased flood frequency and severity are also associated with destructive landslides and mud flows.

11. The combined effects of untreated domestic sewage, solid waste disposal and industrial effluents have significantly increased pollution loads. In the upper basin, pollution is caused by domestic and industrial waste from Bandung. Runoff from hillside farms, in addition, bring in massive amounts of plant nutrients that induce eutrophication in the reservoirs. On its route to Jakarta, the West Tarum Canal intersects the Bekasi River which drains a rapidly developing urban area and is polluted by untreated household sewage, industrial wastewater, and solid waste dumped along the river banks.

B. Ecological Resources

12. Remaining forests cover only about 10.2% of the program area—100,600 ha of primary forest, and 34,800 of secondary forest—far less than the 30% mandated in the 1999 national forestry law. While nearly all of the remaining primary forests are designated for protection and conservation, secondary forests are still considered as production forests where harvesting of timber and other forest products is allowed. Much of the remaining forest area is fragmented, a condition that threatens ecosystem viability and makes these areas vulnerable to continuing encroachment and conversion for upland farming.

13. Two national parks are located in the upper part of the basin: Gunung Gede Pangrango (15,000 ha), and Gunung Halimum (40,000 ha). Both are classified by IUCN as Category II, to be managed for ecosystem protection and recreation. WWF has underscored the international biodiversity importance of Java’s remaining forests as these are among the most ecologically intact areas of forest remaining in Java. A wealth of biodiversity also exists in village gardens that are found extensively throughout the basin. These places retain important relic populations of lowland biota that has all but disappeared from many areas in Java.

14. The West Java Environment Protection Agency (BPLHD) surveyed the entire length of the Citarum River to determine the effect of pollution on the biodiversity of macro benthic fauna at the various locations. The 2003 report indicated a decline in macro benthic faunal diversity that correlated statistically with many of the water pollution indicators.

15. There are no significant coral reefs and sea grasses off the Java sea coast of the Citarum river system. However, there are significant mangrove areas which, together with the three man-made reservoirs, make up the wetland ecosystem of the basin.

C. Socio-Economic Conditions

16. The basin population in 2003 was 17.8 million and is projected to reach 21 million by 2010. The dynamism of the region's economy is shown by 2003 data indicating West Java province's GRDP growth rate (4.97%) outperforming that of Jakarta (4.39%). Nonetheless, poverty is still pervasive in various parts of the basin.

17. The program area covers 9 districts and 2 cities. Of the 9 districts, 5 lie wholly within the program area. The population in 2003 was 17.8 million, with 4.1 million households: 30% derived livelihood from agriculture, 25% from industry, and 45% from services. The population in the program area is projected to rise to 21.3 million by 2010. The dynamism of the region's economy is shown by 2003 data indicating West Java province's GRDP growth rate (4.97%) outperforming that of Jakarta (4.39%). Nonetheless, poverty is still pervasive in the basin between 5% to 26% percentage of population living below the poverty line.

IV. FORECASTING ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Environmental Impacts of Tranche 1 Projects

18. ***Institutional Strengthening for IWRM.*** This component, through various interventions will pave the way for improved overall capacity to manage both water and environmental quality in the basin. Long term environmental impact is positive and highly significant.

19. ***Water Supply Options and Improved Groundwater Management for Bandung.*** The development of options for water supply to Bandung is itself an environmental amelioration measure expected to have long term positive impact on recovery of the groundwater resource which is currently being pumped at unsustainable levels. The aim is to generate water source alternatives that will enable groundwater levels to recover. This will reduce the cost of pumping for domestic use which is intended to be given priority allocation for groundwater. It will also arrest problems with land subsidence that has aggravated flooding in some areas. Feasible options found through the planning activity are expected to be implemented in future program tranches. In mainly being a planning activity, no direct adverse impacts are expected from this Tranche 1 component.

20. ***Rehabilitation of West Tarum Canal (WTC).*** The canal has been in continuous operation over the past 40 years. The canal's conveyance capacity is now only 70 % of the original due to the sliding of bank slopes and bottom sediment accumulation. Leakage from the canal is more than 10 m³/sec. Open access has made the canal vulnerable to pollution from domestic waste. Canal rehabilitation will have the following beneficial environmental impacts:

- Limiting the open access to the canal (through fencing) will significantly reduce the threat of pollution caused by use of the canal as toilet and its banks for garbage disposal.
- The flow separation of the Bekasi river's crossing with the WTC will significantly reduce the existing problem of polluted and sediment-laden river water getting into Jakarta's water supply.
- The project is accompanied by watershed rehabilitation activities in the upper basin to protect/sustain the water source.
- The provision of alternative sanitation facilities (toilets and garbage disposal) for communities living along the canal will reduce the threat of water contamination, including the problem of excessive water hyacinth growth caused by nutrient loading.
- The restoration of canal conveyance capacity will enable tail end flows to be increased to aid in flushing of pollutants in the rivers in Jakarta that receive the canal's tail end flow.

21. The WTC is an artificial channel and does not harbor indigenous benthic communities and fish species. The project area is not located in or near protected areas in the basin. As a rehabilitation project, no new or unprecedented environmental impacts are expected during the canal's continued operation. The rehabilitation of the canal will not result to increasing the irrigated area or developing new areas for agriculture. Adverse new impacts are those expected during the conduct of rehabilitation works – in particular the effects of canal dredging and construction of the Bekasi river inverted siphon. Dredging would unavoidably disperse bottom sediments and require proper disposal of the dredged material. Related impacts are summarized below:

During Pre-Rehabilitation	Pre-rehabilitation activities involving maintenance dredging is already creating turbidity impacts. However, there are no reports of adverse effects on the operation of the irrigation facilities and PDAM-Bekasi abstraction of water from the canal.
During Rehabilitation	<ul style="list-style-type: none"> ▪ Increased water turbidity downstream of the canal undergoing dredging and rehabilitation; ▪ Increased water turbidity downstream of the Bekasi River during construction of Bekasi siphon; ▪ Odor, nuisance and traffic disruption due to sediment piling on canal banks for drying before hauling to disposal sites; ▪ Reduction in area available for rice farming, as well as silt runoff onto the paddy fields due to sediment disposal on ex-riverbeds; ▪ Area disruption and nuisance due to increased traffic, noise and odor from dredging activities; and ▪ Reduced access by residents that draw water from the canal or use it for cleaning/bathing.
During Operation	Fencing of the populated sections of the canal from (Cikarang to Bekasi) will restrict people's access to the waterway for drawing water and washing purposes.

22. **Roll-Out of System Rice Intensification.** Use of organic fertilizer will be promoted because it is essential for improving soil structure in order to maximize benefit from SRI. Reduced usage of chemical fertilizers will decrease threat of contaminating water bodies. However, it is uncertain if SRI would increase fertilizer and pesticide consumption compared with the present practice of continuous flooding of paddy fields.

23. **Community-driven Initiatives for Improved Water and Catchment Management.** By providing alternatives for water supply and wastewater disposal for communities living along the riverbanks and WTC, river water quality improvement is expected along with reduced risk to public health. However, construction of communal sanitation facilities (e.g., excavation of septic tanks), including construction of community garbage collection facilities, may temporarily cause local disruption and nuisance.

24. **Basin Water Quality Improvement Strategy and Action Plans.** The positive environmental impact of this planning component, although indirect, is highly significant and long lasting in terms of reducing water pollution threats from various sources.

25. **Productive Reforestation and Biodiversity Protection.** The EARF specifies that projects should take advantage of opportunities to generate complementary environmental benefits, i.e., biodiversity protection as part of watershed management. In turn, the most effective watershed rehabilitation strategies are those that re-establish basic ecosystem processes. Protected areas in the upper basin that harbor important or endangered flora and fauna will be better protected, while at the same time ensuring sustainability of surface water sources.

B. Mitigation Measures for Some Adverse Impacts

Mitigation Measures	Implementation
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Mitigation Measures	Implementation
<p>Minimize the need for and volume of dredging by taking into account the reduction in projected water supply requirement for irrigation. Although WTC's present conveyance capacity is insufficient to cope with future peak water demands, it may not be necessary to restore its dimensions to the original 1960s design, particularly in the lower reaches where the future peak demand from irrigation is projected to decrease due to land conversion from agriculture to urban use. Therefore, the waterway area need not be dredged or excavated to restore the original flow capacity, thus reducing the volume of the dredging works.</p>	<p>During the detailed design of the WTC rehabilitation, PMU shall re-examine the assumptions for the projection of peak water demand to be supplied by the canal. If projected future water demand is lower than the canal's original design capacity, then the volume of dredging and excavation required can be further reduced.</p>
<p>Each section of the canal should be tested for bottom sediment contamination prior to dredging. If contaminants are present, double silt traps should be used to prevent dispersion of sediment.</p>	<p>Until PJT II is able to routinely monitor heavy metals and other toxics, sediment testing and monitoring shall be done by the PMU (through its EMO) and a contracted service laboratory.</p>
<p>Dredging spoils must be dewatered before moving to allow the foul smell to subside and so that these are dry enough to be transported to the spoil banks without excessive spilling on roads.</p> <p>Use dredging spoils as resource. Coarse sediments could be used as base material for improving inspection roads in the irrigation service areas.</p> <p>The ex-riverbed dump sites for the soft sediments could be developed as nurseries to supply seedlings for reforestation or urban greening. At the ex-riverbed disposal areas for spoil, adequate drainage should be provided to prevent flooding and washout of deposited sediments. The area allocated for sediment disposal should be surrounded by protective embankment/bunds to prevent silt runoff into the surrounding areas. A security fence should be installed to prevent contact between farmers/residents and fresh sediments.</p>	<p>Contractor shall be required to submit turbidity control and spoil disposal plans and contingency measures, which will be included in the bid proposals and evaluation. Plan for works shall include the development of the ex-riverbed dumpsites for tree nursery (Curug, Cibeet and Cikarang) and park (Bekasi). The cost of these measures will be built into the contractor's budget. Contractor shall be required to post bond to ensure compliance.</p>
<p>Odor from dredged anaerobic sediment is to be expected. Although the smell subsides within a few days of exposure to air, residents in the immediate vicinity of the dredging should be informed and assured that the foul smell is temporary.</p>	<p>Contractor plan shall include measures to minimize nuisance to nearby communities. Contractor will also be responsible for notifying communities of temporary nuisance to be expected, and for providing adequate signs and detours in the work areas.</p>
<p>Affected communities should be informed of the disruptions to be expected and their duration, and contractor should be required to prepare spoil disposal and nuisance minimization plans. Contractor should also plan the works without need for cutting-off the downstream flow.</p> <p>Alternative source of water supply should be provided to communities along the canal that tap water from the stream or use it for washing/bathing purposes.</p>	<p>The bid documents shall require contractor to plan works without need for cutting-off the downstream flow. The soundness of these measures should be part of the criteria for awarding work contracts.</p> <p>The PMU, through the community initiatives component of Tranche1 and assisted by a community water supply consultant, shall develop design and construction guidelines—to be used by NGOs assisting the communities in constructing the alternative water supply facilities (groundwater wells). Cost built into the Tranche component on community initiatives for water supply and sanitation improvement.</p>
<p>For SRI, alternatives to exclusive chemical pest/weed control should be promoted, e.g., integrated pest management (IPM). The latter is essentially a strategy of more than one method of pest control, with chemical control (pesticides) resorted to only as a last resort and based on economic thresholds.</p> <p>IPM should be combined with System Rice Intensification (SRI). Both are knowledge-based practices. Requirements for effective SRI-IPM are site-specific. The mode of extending the technology to farmers must be carefully planned.</p>	<p>The Directorate-General for Land and Water under the Ministry of Agriculture (as the envisioned project implementing agency), with support from a project consultant (expert on SRI-IPM), will implement the combined SRI-IPM approach to enhance environmental soundness and sustainability of the project.</p>
<p>Provide adequate measures for community information and involvement in water supply and sanitation planning.</p> <p>Septic tanks should have sealed bottoms and should not be constructed closer than 15 m from wells and creeks used for water supply.</p> <p>Stakeholder forums should be established to address community water supply and sanitation issues and options confronting the Bandung sub-basin and communities along the WTC.</p>	<p>The PMU, through the community initiatives component of Tranche 1 and assisted by sanitation consultant, shall develop design and construction guidelines for communal septic tanks—to be used by partner NGOs assisting the communities in properly constructing the facilities.</p> <p>Budget is built into the Tranche 1 component on community initiatives (for water supply and sanitation improvement)</p>

V. MONITORING AND INSTITUTIONAL ARRANGEMENTS

A. Monitoring Parameters and Responsibilities

Monitoring Items/Parameters	Location and Frequency	Responsibilities
<p><i>Construction Method/Activities</i></p> <ul style="list-style-type: none"> • Equipment and method used for dredging • Conformity to safeguards built into contractor's contract • Handling of sediment and water hyacinth removed from the canal for drying along canal banks prior to hauling • Provision of adequate silt traps to prevent sediment dispersion downstream; use of double silt traps for sections where contaminated sediments are found based on results of bottom sediment analysis done prior to dredging each section 	<p>Monitor at all sections of the canal that are contracted for construction, dredging or excavation.</p> <p>Monitoring to be done through unannounced visits and inspection of construction or dredging sites at least once every three days.</p>	<p>Contractor will be required to submit detailed construction plan considering the safeguards, including specific plan for handling of construction debris, including dredged sediment and water hyacinths removed. Contractor shall be required to post bond to ensure compliance.</p> <p>Construction supervisor of the PMU will be responsible for ensuring compliance and corrective action by contractor.</p>
<p><i>Nuisance Impacts</i></p> <ul style="list-style-type: none"> • Odor from dredging of anaerobic sediments, and from dewatering of dredging spoils on canal banks before hauling to disposal sites. • Other nuisance caused by rehabilitation works including noise, dust, traffic congestion on service roads 	<p>Monitor for occurrence and severity of nuisance impacts at the actual construction and dredging sites.</p> <p>Monitor through unannounced visits and inspection of construction or dredging sites at least once every three days.</p>	<p>Contractor plan shall include measures to minimize nuisance to nearby communities. Contractor will also be responsible for notifying communities of temporary nuisance to be expected, and for providing adequate signs and detours in the work areas.</p>
<p><i>Disruption of Water Conveyance</i></p> <ul style="list-style-type: none"> • Canal flow/discharge to monitor any reduction of water flow caused by rehabilitation works, e.g., due to possible flow constriction around the silt curtains in the dredging sites 	<p>Same as water flow monitoring schedule used by PJT II, at the existing water flow measurement points along the canal.</p>	<p>Based on the construction schedule, PJT II shall give advance information to irrigation managers and water supply utilities on any expected water flow disruption or reduction.</p>
<p><i>Water Quality</i></p> <ul style="list-style-type: none"> • Conventional parameters (color, temperature, pH, DO, BOD, total suspended solids, total dissolved solids, surfactants, oil and grease, Nitrogen, Phosphorus, Phenols, total Coliform and fecal Coliform) • Water turbidity at and near construction sites (suspended solids) • Heavy metals (Arsenic, Cadmium, Chromium, Lead, Mercury, Zinc) • Other toxic substances (PCB, Phenols, Cyanide) • Pesticides (based on parameters listed in Governor of West Java Decree No 38/1991 and 39/2000 for Class B, C, D water bodies). 	<p>Conventional parameters to be monitored according to PJT II's ongoing monthly schedule of water sampling and analysis at 14 points along the WTC and two points downstream of the Bekasi River.</p> <p>Water turbidity at three points of 1 km interval downstream of construction and dredging sites to be monitored on a weekly basis for the duration of works.</p> <p>Heavy metals, other toxic substances and pesticide residues shall be monitored at least once every quarter at PJT II's 14 sampling points along the canal.</p>	<p>Monthly monitoring of conventional water quality parameters shall continue to be done by PJT II using its personnel and laboratory facilities at Curug. PJT II shall provide monthly reports to the PMU who shall alert contractor of water quality degradation and require corrective measures.</p> <p>The PMU shall be responsible for more frequent monitoring of water turbidity affected by construction activities.</p> <p>Until PJT II is able to routinely monitor heavy metals and other toxics, such monitoring shall be done by the PMU (through its EMO) and a contracted service laboratory.</p>
<p><i>Sediment Contamination</i></p> <ul style="list-style-type: none"> • Heavy metals (Arsenic, Cadmium, Chromium, Lead, Mercury, Zinc) • Other possible contaminants (TPH, PCB, fecal Coliform) 	<p>Prior to the works, testing for bottom sediment contaminants shall be done once for each section of canal to be dredged.</p>	<p>The PMU (through its Environment Management Office) shall contract an accredited laboratory to carry out bottom sediment sampling and analysis. Results are to be communicated formally to the dredging contractor so that measures to minimize sediment dispersal (installation of double silt screens in</p>

Monitoring Items/Parameters	Location and Frequency	Responsibilities
		the affected areas if significant levels of contaminants are present) are implemented.
<p><i>Disposal of Dredged Sediments</i></p> <ul style="list-style-type: none"> • Drying and hauling of spoil • Adequacy of drainage for access/service road improvement works • Adequacy of measures to control erosion of sediments in ex-riverbed sites. • Use of dredging spoils, e.g., as base material for improving inspection roads in the irrigation service areas and development of the ex-riverbed spoil dump sites as nurseries to supply seedlings for reforestation or urban greening. 	<p>Monitoring shall be done at the roadside embankments and ex-riverbed sites.</p> <p>Monitoring to be done through unannounced visits and inspection of sediment disposal areas.</p>	<p>Based on the bottom sediment testing results for sections of canal to be dredged (i.e., grain size, composition, contaminants), contractor will determine location of sediment disposal and appropriate handling/transport precautions. The PMU through the construction supervisor shall review and approve the contractor's handling and disposal of sediments for each section of the canal to be dredged.</p>
<p><i>Disruption of Community Water Supply</i></p> <ul style="list-style-type: none"> • Adequate provision of alternative water supply sources and sanitation facilities for WTC residents that use the canal 	<p>Monitoring of community complaints shall be done at all populated sections of the canal.</p>	<p>Monitoring shall be done by NGOs engaged under the Tranche 1 component on provision of community water supply through community mobilization.</p>
<p><i>Community Health</i></p> <ul style="list-style-type: none"> • Incidence of water-related illnesses 	<p>Monitoring locations and frequency shall follow health survey protocols used by the district health offices.</p>	<p>The PMU shall be responsible for consolidating community health data from the district health offices to detect any deviation/increase in reported incidence of water-related illnesses from the norm (based on past records).</p>
<p><i>Siting and construction of communal septic tanks</i></p> <ul style="list-style-type: none"> • Distance of septic tanks from creeks and wells used for water supply • Disposal of septic tank construction waste • Neighborhood nuisance minimization during construction • Maintenance of communal toilets and septic tanks 	<p>Monitoring shall be done at the community sites on a weekly basis over the duration of the activity.</p>	<p>The PMU, through the community initiatives component of Tranche 1 and assisted by sanitation consultant, shall develop design and construction guidelines for communal septic tanks—to be used by NGOs assisting the communities in monitoring construction of facilities.</p>
<p><i>System Rice Intensification</i></p> <ul style="list-style-type: none"> • Cropping intensity • Change in quantity and frequency of pesticide use • Water use rates (to monitor effectiveness of SRI in water conservation) • Allocation of water saved through SRI 	<p>Monitoring to be done at each pilot site for the SRI introduction.</p> <p>Each SRI site to be monitored at least three times during each cropping season.</p>	<p>Directorate-General for Land and Water under the Ministry of Agriculture (as the envisioned project implementing agency), with support from a project consultant (expert on SRI-IPM).</p>

B. Institutional Arrangements

26. (Provide few lines on Basin Council, Basin Council and its relationship with PMU)The PMU-Environment Management Office will be responsible for undertaking or commissioning follow-on environmental assessments that may be required for AMDAL compliance and clearance of individual projects. The PMU-EMO will identify specific AMDAL and ADB requirements for each project, such as exemption status or type of assessment required (EIA-ANDAL or IEE-UKL/UPL), including the public consultation and review steps mandated in ADB environmental and GOI AMDAL procedures.

VI. PUBLIC CONSULTATION AND DISCLOSURE

27. Stakeholder dynamics has been driven mainly by upper basin and lower basin issues. There has been a long-held perception that water users in the lower basin are not paying enough to maintain the infrastructure and invest in (upper basin) watershed protection. During the initial

phases of the PPTA, there was a perception that concerns of lower basin water users were being accorded greater priority in water resource development. Initial project design recommendations also came under criticism for what stakeholders perceived was an over-emphasis on physical (engineering) issues and a lack of measures to address institutional development.

28. In order to address stakeholder concerns, a shift from project mode to a “program approach” was adopted in mid-2006. Additional measures and safeguards to address the various concerns of stakeholders were identified. The program package took the form of a “roadmap” with an emphasis on long term solutions guided by shared program objectives among multiple stakeholders in the basin.

29. The PPTA Team and DGWR counterpart team ensured that public participation went beyond those taking place in the formal public consultation workshops. This meant taking into account concerns of stakeholders who were not represented in the groups or organizations able to attend the formal consultations.

VII. FINDINGS AND RECOMMENDATIONS

30. A strategic environmental assessment (SEA) was first carried out as part of the basin roadmap development. The SEA also established a tiered approach to environmental assessment and planning. The Environmental Assessment and Review Framework (EARF) formulated as part of the SEA specifies procedures for examining more closely the impacts of projects to be included under each MFF tranche to ensure: (i) consistency with the basin wide assessment framework and (ii) compliance with ADB and GOI environmental assessment requirements for individual projects. The IEE for Tranche 1 was done as a next tier of the SEA, based on the EARF.

31. The ICWRMP-MFF Tranche 1 package is expected to generate significant environmental benefits in terms of more efficient and equitable water resources utilization (both surface water and groundwater); adequate supply to meet growing water demand from households and industry; water quality improvement; rehabilitation of watersheds that ensure water supply sustainability and that also enhances socio-economic well-being of communities; and overall improvement of institutional capacity for participatory basin management.

32. Environmental safeguards are incorporated into the package both as pro-active measures to protect/sustain water resources and to preserve basin ecosystem functions (including biodiversity), as well as mitigation measures to deal with any adverse impacts arising from some activities (notably the WTC rehabilitation).

VIII. CONCLUSION

33. For purposes of compliance with ADB environmental assessment guidelines, no additional study or full environmental impact assessment is needed to further assess the potential environmental impacts of the Tranche 1 MFF package. However, individual projects associated with potential adverse impacts, specifically the West Tarum Canal rehabilitation and construction of communal septic tanks, must comply specified under ADB’s environment policy requirement and Indonesia’s AMDAL system using the procedures, criteria and template for environmental management and monitoring plan in accordance with environmental assessment and review framework.