

News Letter
No.3

February 2006

Please Exchange Your Opinions among all Participants



See You at the next Workshop !!



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News Letter

No. 3: Result of the 2nd Workshop

February 2006



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INTRODUCTION

The 2nd Workshop of the Study on Countermeasures for Sedimentation in the Wonogiri Multipurpose Dam Reservoir in the Republic of Indonesia was held on September 8, 2005. This Workshop was opened by the Director General of Water Resources, Ministry of Public Works and participated by 90 persons including the stakeholders concerned.

The objectives of the 2nd Workshop are:

- To explain the progress to date of the JICA Study during the second field works from May to August 2005.
- To share the current condition and issues on the Wonogiri reservoir sedimentation and Wonogiri watershed condition.
- To share the lesson learned through past experiences on watershed management projects, mainly by World Bank in 1989-1994, and
- To exchange opinions and receive comments from stakeholders concerned to reflect master plan of integrated countermeasures for the Wonogiri reservoir sedimentation problems.

As a keynote speech, The Director General of Water Resources ended his speech by presenting the spirit of managing, conserving, and utilizing water through a traditional Javanese song. The song comprises four (4) couplets covering the importance of water for whole life, which should be managed well and thanked as a grant from God; the necessity of conservation; the utilization of water; and the depraving tendency against water (flood, land slide, water quality degradation, etc.).

MAIN POINTS OF PRESENTATION

The main points of all presentations in the workshop cover:

- Recent issues on the sedimentation of Wonogiri Reservoir cover at least 4 aspects: technique, social, coordination among agencies, and law/regulations.
- The presenters have observed and shown the real and specific problems of Wonogiri Reservoir and its watershed at several locations, about what have already been done, where and how been done.

- Efforts on erosion control have been carried out. However, massive erosion continues and enters into the Wonogiri Reservoir.

- The basic concept of management master plan has been presented, but further elaboration is still required to achieve the objectives of the Study.

- Distribution of community welfare in the Wonogiri watershed is still unbalance. Various indicators, illustrating the portrait of socio-economic condition of the society, show the Wonogiri area is still in the low level of welfare.

- It can be identified that the poverty would be an important factor in the cycle of cause of erosion. Therefore, poverty alleviation is a part of disconnection of the cycle of cause of soil erosion problem.

- The conclusion of the Study has not been presented yet, it needs more fact analysis or findings.

- Information of research outcomes on reservoir sedimentation and its conceivable countermeasures were presented and recommended to be used as a comparison to develop a logical understanding toward findings, assumptions, and calculation for sedimentation issues in the Wonogiri Multipurpose Reservoir.

- Introduction of GN-KPA (*Gerakan Nasional Kemitraan Penyelamatan Air*/Partnership on National Movement for Water Preservation) has inspired necessity on water conservation and it is useful for a reference of elaboration on specific efforts to overcome the sedimentation problem in the Wonogiri reservoir.

There were several things in the presentation on which the participants concerned for clarification, discussion, and suggestion (See the table in the following page). Most clarification and discussion comprise suggestions enlarging participants' view so that they could understand and approve the presentation materials.



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Ministry of Public Works



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Mr. Sudjarwadi
Chairman of the 2nd Workshop,
Gadjah Mada University



Mr. Sutioso Budirahandjo
Presenter (Director of PUFI Solo)



Mrs. Endang Siti Rahayu
Presenter (Sebelas Maret University)



Mr. Kusnaeni
Presenter (JIK-PA)

Classification of Issues of Workshop II

10. USE OF DREDGED SEDIMENT

- Even though very fine sediments are usually not able to be used for construction materials, a laboratory research on the sediment materials of Wonogiri reservoir is considered necessarily to be carried out for a higher economic uses.
- Survey is necessarily to be conducted in surrounding watershed for further usage.

11. GREEN BELT

- In the management of green belt by empowering the community, the behavior (culture) of local community is of a great importance for considerations; therefore it is not enough just by fulfilling their needs.

12. OTHERS

- GN-KPA (*Gerakan Nasional Kemitraan Penyelamatan Air*/Partnership on National Movement for Water Preservation) has inspired necessity on water conservation and it is useful for a reference of elaboration on specific efforts to overcome the sedimentation problem in the Wonogiri reservoir.
- In relation to the JJ-KPA (*Jaringan Informasi Kemitraan Penyelamat Air* / Partnership on Information Network for Water Preservation), the management of water resources data would better be undertaken by an independent organization / agency. Like a spatial data management, the year 2005 program has been launched as the Year of Infrastructure for Spatial Data, covering national and regional spatial ranges.
- It needs a campaign of 'going down'. Settlement and land cultivation should be on a flat low land instead of steep slope land. Young generation should not live and cultivate the steep slope land.
- The steep upland should be bought by the government for reforestation.
- Local Government needs to be more sensitive toward society's concern.
- Distribution of community welfare in the Wonogiri Dam watershed is still unbalance. Various indicators show the Wonogiri area is still in the low level of welfare.

5. RESERVOIR LIFE

- In accordance with sedimentation, the predicted service life of the Wonogiri reservoir of 125 years was based on the effective volume of the reservoir, while the prediction of BP2TPDAS was based on the volume of reservoir's sediment storage.

6. RESEARCH COMPARISON

- Information of research outcomes on reservoir sedimentation and its conceivable countermeasures were recommended to be used as a comparison to develop a logical understanding toward findings, assumptions, and calculation for sedimentation issues in the Wonogiri reservoir.

7. LAW ENFORCEMENT

- The environmental conservation must be associated with Regional Law Enforcement to prohibit building constructions in the green belt. Hence, participation of the local government and community is of great importance.

8. RIVER BASIN DEVELOPMENT

- River basin development in Bengawan Solo was unbalance between upstream and downstream areas (more in downstream reach, i.e. river improvement, etc., but less in upstream areas, i.e. dam construction, check dam, etc.).

9. BUDGET

- The arrangement of budget should be based on the planning.
- Implementation of conservation measures should be efficiently done based on both budgeting and the location
- Information from field staffs of State Forest: The plants need to be maintained but the budget comes in the period when water from rainfall (for plants maintenance) decreases; as a result, the maintenance is not sustainable.

3. SOCIAL ECONOMIC MEASURES

- The management of sedimentation is basically a management of human behavior, therefore its countermeasure should more emphasize to the empowerment of people at the upper basin than to physical approaches.
- To increase farmers' welfare, consolidation in business is required for various corporations, like farm-corporation (including marketing).
- Access to capital is out of farmers' capability, therefore the access on capital / credit pattern should be opened more broadly and easily through government supporting policies (regarding with the complicated bank rules).
- The socio-economic survey involving the off-farm income indicated that the young workers prefer to off-farm jobs since there is no incentive in agricultural fields.
- Such indicators illustrating the portrait of socio-economic condition of the society have been found. These are used to determine such policies for solution approaches of sediment problems in line with the characteristic of economy of the society.

4. EROSION MEASURE

- Previous research pointed out that erosion sources from off-farm (river bank, road side, etc) was about 70% while from on-farm (farm lands) was 30%, so it requires a concept of erosion countermeasure for off-farm lands. However, it is unclear who should handle the off-farm activity.
- Such successful methods of soil conservation should be applied for the next countermeasures. However, if the decrease of sediment production was caused by the lack of soil covering, it would be another matter.

1. POVERTY

- The source of problem is, indeed, poverty for the constraints of farmers, e.g., constraints in the access of agricultural land and of capital (farmers do not have an access to the bank) as well as an access of information (farmers do not have information about markets).
- The poverty affects (i) careless of the impact of illegal logging (they use it for cooking and burning limestone), (ii) planting and building structures in the area of green belt. It is therefore required socialization about conservation, urgency, impact, and required 'Perda' (local government regulation) about environment in Wonogiri.
- Even the poverty would be an important factor in the cycle of cause of erosion, disconnection of the soil degradation cycle is not easily carried out as it needs an integration of fund and countermeasure.
- As a result of the poverty, young and productive people get off-farm jobs and on-farm activities become marginal.

2. COMMUNITY PARTICIPATION

- A research on how to raise community participation in greening and soil conservation activities is required involving internal factors of farmer (characteristic and income of farmers) and external factors covering (a) source of technology and innovation (mainly from the field extension workers), and (b) type of 'provocation' by which the cadres will be capable to encourage people in conservation of farm lands.
- The community should be involved in maintaining the plants as it needs socialization in the field.
- Farmers are always willing to respond for such activities that benefit them.
- Dialogue is needed to synchronize farmers' aspiration and government's capability.

QUESTIONNAIRE

Each participant of the workshop was kindly expected to fill in a provided questionnaire which consists of related issues of the Wonogiri Reservoir sedimentation. A total of 62 questionnaires collected from 90 participants) resulted in the following summary:

- The workshop was useful to comprehend more deeply about the problem of Wonogiri reservoir sedimentation.

Reason:

- ◆ The workshop displayed the feature and the newest concrete information of the Wonogiri reservoir problems.
- ◆ An optimal solution could be hopefully achieved through the workshop by changing idea / opinion / experiences among the participants.
- ◆ However, the workshop was necessary to be further taken action for solving the existing problems either by technical or non-technical measures.

Ideal/Opinion of Non-Technical Countermeasure:

- ◆ Since erosion was declared much related to the poor condition of the people, poverty alleviation could be performed by developing home / small industries, an agribusiness approach covering high economic values of yearly crops cultivation, decreasing inhabitant density through transmigration.

Benefit of the Wonogiri Reservoir:

- ◆ 49 participants got benefits from the reservoir through tourism / public services, fishery, irrigation, hydropower, and flood control.



- ◆ To sustain and increase the benefit of the reservoir, some actions could be performed such as (i) planting of perennial / yearly crops at uphill areas; (ii) more activities at the reservoir covering sports, arts, tourism, business; (iii) effectiveness of green belt.
- ◆ The dredged reservoir sediment having an economic value should be of such benefits for local people.

Cost Sharing Contribution:

- ◆ Most participants (82 persons) from out side of Wonogiri / downstream area agreed with a kind of contribution (cost sharing) under the following conditions:

- Related regulations are available.
- Regular water supply is guaranteed.
- The maintenance and development of the reservoir should be optimized in advance.



- ◆ The contribution from downstream areas could be performed by local government through General and Specific Allocation Fund.
- ◆ However, due to the low level of economic condition of most farmers, some participants considered that the contribution should not be applied.

Conservation of Watershed:

- ◆ 72 participants convinced that conservation impacts significantly to reservoir preservation. The conservation was not only by technical measures but also non technical / vegetative measures which involves community participation, and changing people custom as well. In addition, these participants considered that reducing of soil erosion at the upstream area might be more effective than handling of sediment deposit in the reservoir.

Applied and proposed activities concerning the conservation efforts would be:

- ◆ Consistency in the implementation of National Movement of Land Rehabilitation, i.e., greening on 30% of total watershed.
- ◆ Law enforcement.
- ◆ Terrace development involving forest farmer society.
- ◆ Planting of productive perennial crops.
- ◆ Cultivating bare lands with 'tumpangsari' system, empowering community in critical lands and villages.
- ◆ Empowerment of a 40 year-cycle of community forest with a minimum logging of 21 years.
- ◆ Regular activities on forest and land rehabilitation, funded by local and national budget, by the Agency of Environment, Forestry, and Mining.
- ◆ Building of technical measures: small reservoirs ('embung'), absorption wells, check-dams, etc.
- ◆ Management of community in applying the cutting pattern of community forest.
- ◆ Strengthening of agricultural institutions in 12 villages in Wonogiri.
- ◆ Selection of technology of conservation is discussed with the land owner and should be suitable with the condition of land.
- ◆ Implementation of Pilot Project and Land Conservation Action Plan.
- ◆ Providing information of greening through leaflets and training.
- ◆ Removing and processing of dredged sediment for an economical material.

News Letter

No.4

January 2007

Please exchange your opinion among all participants



Workshop III



Interview to farmers



Workshop III

Wonogiri Dam Under Construction in 1981



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January 2007

News Letter

No.4
 Result of the 3rd Workshop
 & Proposed Master Plan



The Study on Countermeasures for Sedimentation in the Wonogiri Multipurpose Dam Reservoir in the Rep. of Indonesia



Japan International Cooperation Agency
 Dir. General of Water Resources
 Ministry of Public Works
 The Rep. of Indonesia

Prepared by JICA Study Team
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RESULTS OF THE 3rd WORKSHOP

INTRODUCTION

The final goal of the Study on Countermeasures for Sedimentation in the Wonogiri Multipurpose Dam Reservoir is to implement the countermeasures proposed in the Master Plan to secure the long-term ability of the Wonogiri reservoir to supply water for irrigation and hydropower generation. Along this line, workshops have been so far held three times inviting all stakeholders to incorporate various demands and needs into the process of master planning as well as identification of issues and causes of sedimentation.

The results of the 1st and 2nd workshop were summarized in the News Letter 2 and News Letter 3 respectively and distributed to the stakeholders when the 2nd and 3rd workshops held.

The 3rd workshop was held on February 14, 2006, opened by the Director General of Water Resources, Department of Public Work, and participated by 100 persons. The objectives of the 3rd workshops are:

- To explain the progress to date of the JICA Study during the second field works from October 2005 to January 2006
- To explain and discuss the basic strategies for reservoir sediment management system
- To explain and discuss the basic strategies for master planning on Wonogiri watershed conservation and management
- To exchange opinions and receive comments from stakeholders to reflect master planning of integrated countermeasures for the Wonogiri reservoir sedimentation problems.

THEMES OF PRESENTATION

There were 6 themes of presentation in the 3rd workshop consisting of:

1. Basic Strategy for Wonogiri Reservoir Sediment Management Master Plan
2. Erosion Sources and Sediment Yield from Wonogiri Watershed
3. Basic Strategy for Wonogiri Watershed Conservation and Management Plan
4. Village Assessment and Village Action Plan
5. Initial Environmental Examination (IEE)
6. Organizational Setup for and Beneficiaries' Funding Assistance to Wonogiri Watershed Conservation Activities

MAIN POINTS OF DISCUSSION

Non-structural Measures

Countermeasure for sediment yield from watershed closely relates to watershed conservation. The major focus of input is economic, social and cultural approaches in order to implement satisfactorily the activity of conservation by the stakeholders.

Main concern to the people in Wonogiri is to provide a better economical condition through sustainable conservation. Therefore, problem solving by conservation should emphasize on non-structural approaches and involve the people from the planning to implementation stages.

Efforts on non-structural measures should be in short, mid, and long terms. It should also consider increase in understanding and awareness of community at surrounding forest and active participation of community at every stage of activity.

For off-stream conservation, reforestation management shall apply Fast Growing Species (FGS), Multipurpose Tree Species (MPTS), or such productive enterprises to increase people's income.

People cultivating the land of 30 - 50% in slope by seasonal crops. Changing of cropping pattern by the people seems uneasy in a short period.

Wonogiri watershed conservation should refer to the experiences of conservation project already conducted in several regions.

Structural Measures

Wonogiri reservoir has been threatened by sedimentation problem resulting in sediment deposit in front of intake. Countermeasure is urgently required to sustain the function of the reservoir. The intake problem should be tackled in the short term plan, and, the watershed should be conserved in the long term plan.

Modification of the intake would not be so easy, because it will inevitably require such disadvantages as stopping of power generation and irrigation water supply during the modification works.

Community around the reservoir really needs electric supply from the PLTA Wonogiri, therefore the modification of the intake should not be recommended.

Involvement of Local Government and Community

Watershed conservation is not only in charge of the Department of Public Works but also Departments of Forestry and Agriculture as well as local government and community. Most of the beneficiaries are local governments of Sukoharjo, Karanganyar, Sragen, Klaten, and Ngawi. People in the upstream do not get direct benefit from the reservoir. However, activities of watershed conservation are always proposed from them. Therefore, some aids need to be provided to solve their economic problem. The local government of Wonogiri greatly supports this Study and implementation of the Master Plan.



Sediment Release

Countermeasure for sedimentation in the the Wonogiri reservoir should protect the intake from the blockage by sediment / garbage deposits as an urgent plan for continuous water supply. In addition, the operation and maintenance of cleaning up the trash rack needs to be clearly described. The watershed should be then conserved in a long-term plan.

Sediment flushing to downstream reach is necessary to take into account the effect of sediment trap at the Colo Weir.

Implementation

The structural and non-structural measures should be implemented comprehensively considering the upper and lower reaches of the Wonogiri Dam and involving public participation, so it needs capable institutions management (executing and implementing agencies) to govern the implementation.

In addition, the role of central government needs to be explained and put in a recommendation as the Wonogiri reservoir is definitely a cross-province watershed and requires an integrated management covering all stakeholders.

However, the lack of proper coordination in watershed management has been an issue so far. Establishment of committee coordination for watershed conservation & management should be proposed to National Water Council for recommendation.

GNKPA (National Movement of the Partnership for Water Preservation) should implement this master plan. It is preferable that the scenario of the study and its master plan preparation should be in the direction of GNKPA, who has an authority in governing its implementation based on community participation and covering multi sectors for people empowerment supports off-stream conservation.

An organizational framework of soil conservation at provincial level is necessary to get involve BKPRD (Local Land Usage Coordination Board) as well.

Law

Law No.7/2004 on Water Resources Management that consists of stipulation on water utilization, conservation and preservation as well as depraving effect of water would be an entry point for watershed management.

Regarding with Law No.7/2004 and Law No.32/2004 about Local Government, 'One River one Plan one Management' concept needs to be modified to 'One Basin One Integrated Planning in Coordinated Management'. The new concept aims at integrating all components as stipulated in the regulation of the Minister of PU No.377/PRTM/2005 about National Movement on Partnership of Water Safety.

Others

An issue remains the same i.e., the benefits of the Wonogiri dam were distributed unequally between the irrigated area and watershed area.

It is necessary to consider the change of farmers' work after implementation of watershed conservation so that they would not repeat the past activity that destroyed the lands.

Low enforcement is definitely required to cope with illegal logging.

Training and a guideline on ecological friendly land management to increase people's income in an integrated cooperation activity needs establishing.

MASTER PLAN ON SUSTAINABLE MANAGEMENT OF WONOGIRI RESERVOIR FUNCTION

The Wonogiri Dam should continue to contribute to stabilization of people's livelihood as well as improvement of social welfare at least in coming 100 years. This goal will be achieved only in the way to secure and maintain the expected function of the Wonogiri reservoir in terms of flood control, irrigation water, domestic and industrial water supply and hydropower generation.

To achieve the goal, a Master Plan was proposed, explained and discussed at the Steering Committee meeting, chaired by Director General of Water Resources, Ministry of Public Works, held at Jakarta twice on July 4 and 19, 2006, and approved by the Steering Committee. After the approval, feasibility study on the proposed urgent countermeasures was commenced.

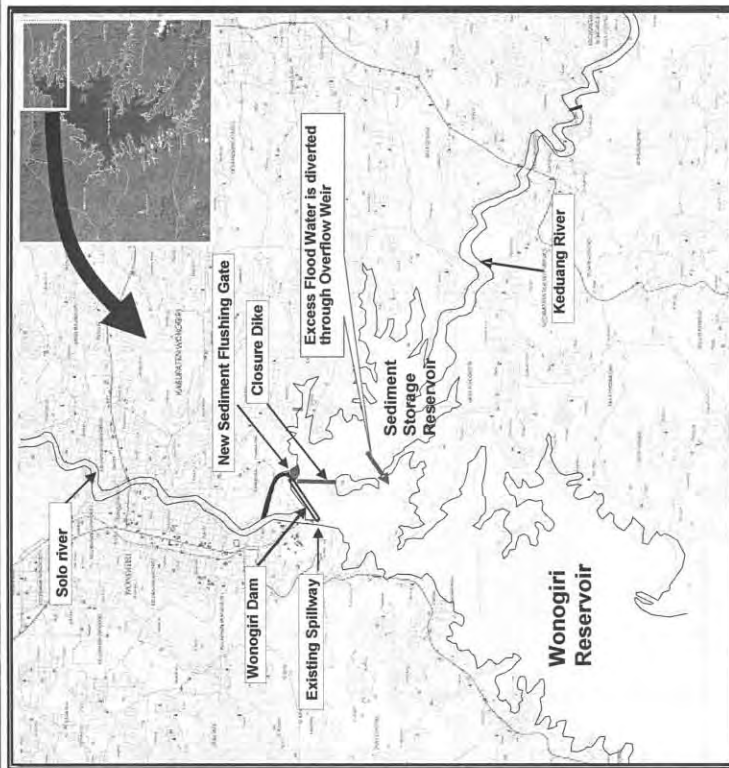
The Master Plan comprises the combination of both structural and non-structural measures and is implemented by the following phase:

1. Urgent Countermeasures, to keep proper function of the intake
 - a. *Sediment Storage Reservoir with New Gates*, to pass through and flush out the inflow of sediment and garbage from the Keduang River
 - b. *Watershed Management in Keduang catchment*, to mitigate sediment yield in the Keduang catchment and thereby reduce sediment inflow into the reservoir
 - c. *Periodic Maintenance Dredging at Intake*, to avoid blocking at the intake due to sediment deposits and garbage
2. Mid Term Countermeasures, to keep in order the Wonogiri reservoir functions
 - a. *Watershed Management in Other Tributaries*, to mitigate sediment yields in other tributary catchments and thereby reduce sediment inflow into the reservoir
3. Long Term Countermeasures, to keep in order the Wonogiri reservoir functions
 - a. *Rehabilitation of Watershed Management Areas*, to keep in order the conserved Wonogiri watershed function

The Wonogiri reservoir will be separated by closure dike into two reservoirs, namely a *Sediment Storage Reservoir with New Gates* and a large main Wonogiri Reservoir, and operated independently.

Sediment Release from Sediment Storage Reservoir

The Keduang River is the primary cause of the current sediment-related problems in the Wonogiri reservoir. Almost all of the sediment inflow from the Keduang River would be completely retained in the Sediment Storage Reservoir. Sediment release from the Sediment Storage Reservoir will be carried out in terms of sediment sluicing and flushing.



Flushing is a common measure world-wide as experienced in the Brantas River and can re-mobilize sediments that has already deposited by emptying the Sediment Storage Reservoir. The Reservoir can be recovered by the inflow from the Keduang River because of its small capacity (14 million m³). Flushing utilizes the natural sediment-transport characteristics of river by establishing river flow inside the Reservoir.

On the other hand, sluicing (sediment routing) is intended to reduce the trap efficiency of the reservoir by means of minimizing sediment deposition during flood periods. By sluicing, a substantial portion of the incoming sediment loads with high concentrations is passed through the Sediment Storage Reservoir. Sediment sluicing may not be able to remove previously deposited sediments in the Reservoir. In many cases, sluicing and flushing are used in combination only when some excess water is available.

Watershed Conservation and Management

To mitigate soil erosion and sediment yield from the watershed, the Master Plan is proposed to implement a comprehensive approach through watershed management focusing on public involvement through encouraging the local farmers to improve their current land use practices (community-based management). It will be done by motivating a socio-economic development in the upland areas and thereby to reduce the rate of erosion from dry land farming areas.

For strengthening of supports for local farmers in executing the watershed conservation, technical and financial supporting programs will be formulated covering:

- a. Support program for soil and water conservation project
- b. Support program for land management and agricultural promotion
- c. Support program for community development
- d. Monitoring and evaluation at village level

Organization of Management

Three levels of organizations are involved in watershed and conservation management; i) local government agencies, ii) provincial and other regional government agencies and iii) central government agencies. These agencies are in two principal sectors, forestry and agriculture.

In addition, multi-sector management and coordination shall be required for its successful implementation. Therefore, it is highly expected that GNKPA plays the key role for successful implementation of watershed management in view of enhancement of coordination of many relating agencies.

Others

A sustainable system for benefit transfer from the Wonogiri dam beneficiaries downstream to upstream watershed management is being studied in the feasibility study stage

Implementation Schedule

Measures	2006		2010		2015		2020		2025												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1 URGENT COUNTERMEASURES (1) Financial Arrangement (2) Compartmented Reservoir with New Flushing Gate (3) Watershed Conservation in Keduang River Catchment (4) Maintenance Dredging at Intake																					
2 MID TERM COUNTERMEASURES (1) Financial Arrangement (2) Watershed Management in Other Tributaries 1) Tritonoyo 2) Upper Solo 3) Alang 4) Temon 5) Ngungahan 6) Wuryantoro 7) Remnant basins																					
3 LONG TERM COUNTERMEASURES (1) Rehabilitation of Watershed Management Areas																					
4 MONITORING Periodic Monitoring for Sedimentation at Intake Periodic Monitoring for Sedimentation in Reservoir																					

□ Financial Arrangement □ Design □ Construction □ Procurement

IMPLEMENTATION OF WATERSHED CONSERVATION

The basic directions applied for the formulation of watershed conservation have been contemplated by consulting with the project related agencies and the past project experiences, results and finding of the research activities and technical guidelines.

The basic directions have been set for: i) proposed land use/agro-forestry development (slope classes and proportion of annual crops / trees), ii) slope classes and terrace types, iii) vegetative measures, and iv) the accommodation of soft components (support programs for executing conservation measures).

Local people are the most important factor in good watershed conservation and management. Communities at field and village level should take a responsible role for the proposed watershed as practitioners from the stage of planning and its implementation with collaborative activities of all stakeholders and implementing agencies.

The proposed implementation arrangement should be initiated with an implementation committee to be established at the village level. A tentative proposed organization at field and village level has been set up for the implementation of conservation measures as illustrated below.

The role and responsibility should be clearly defined to avoid confusion amongst the stakeholders. The tentative responsibility of each stakeholder is presented in the right table.

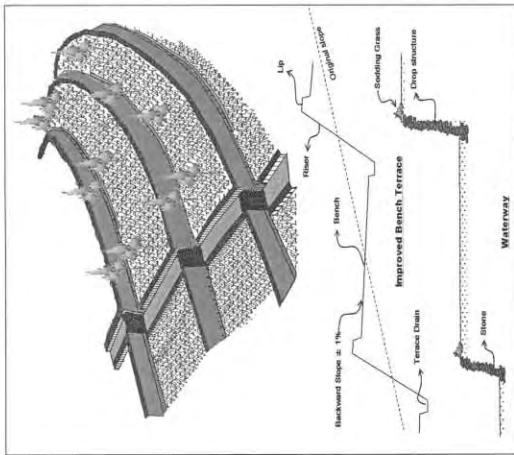


Image of Improved Bench Terrace

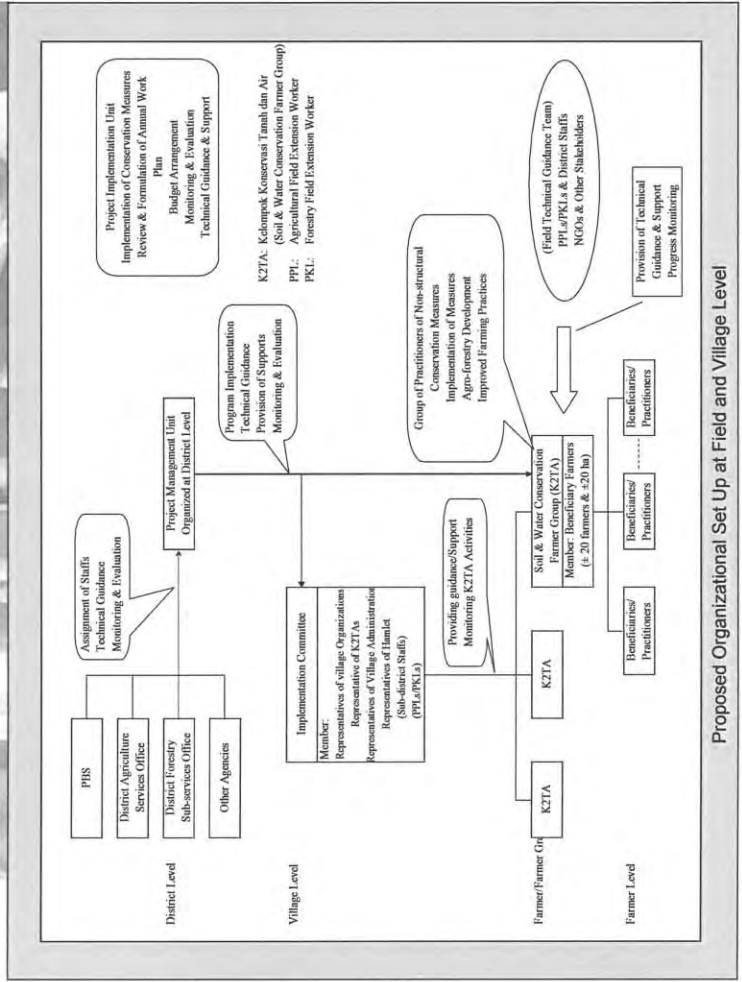


Role of Stakeholders Concerned

Component	Executor	Supervisor/Implementation Committee	Supporter/Extension staffs (PPL/PKL) & Executing Agency
(1) Terrace Improvement Works	K2TA	Implementati-on Committee	Extension staffs (PPL/PKL) & Executing Agency
(2) Terrace Formation/Upgrading Works	Contractor and K2TA	Implementati-on Committee	Extension staffs (PPL/PKL) & Executing Agency
(3) Village Grant Fund	Village people	Implementati-on Committee	NGO and Executing Agency
(4) Monitoring & Evaluation	K2TA	Implementati-on Committee	NGO and Executing Agency
(5) Support Programs for Soil & Water Conservation Measures	Extension staffs (PPL/PKL) and Consultant	Implementati-on Committee	NGO and Executing Agency
(6) Support Programs for Land Managt. & Agricultural Promotion Measures	Consultant	Executing Agency	Executing Agency
(7) Support Programs for Community Development	K2TA & other village organizations	Implementati-on Committee	NGO and Executing Agency

Responsibility of Stakeholders

Stakeholders	Responsibility
Farmers	Operation and maintenance of individual land
K2TA	Terrace improvement and upgrading
Contractor	Terrace formulation and supply of materials
Implementation Committee	Supervision of all work, coordination with executing agency, and operation of village grant.
Extension staffs (PPL/PKL)	Technical training and guidance to K2TA
Consultant	Technical training and guidance to Extension staffs
Executing Agency	Supervision of project implementation, coordination with Implementation Committee, and operation of project fund



Proposed Organizational Set Up at Field and Village Level