Document No.: 2017P6-INA-PP
Receiving Date:
(For APFNet Secretariat)

Asia-Pacific Network for Sustainable Forest Management and Rehabilitation

PROJECT PROPOSAL

Development Participatory Management of Micro Catchment at the Bengawan Solo Upper Watershed

[Watershed Management Technology Center (WMTC),
Research, Development and Innovation Agency,
Ministry of Environment and Forestry of Indonesia]

[30 September 2016]

Project title	Development Participatory Management of Micro Catchment at The Bengawan Solo Upper Watershed [2017P6-INA]
Supervisory agency	Extension and Human Resources Development Agency, Ministry of Environment and Forestry, Indonesia (BP2SDM)
Executing agency	Watershed Management Technology Center (WMTC)
Expected project duration: June/2017 to May/2019, 24 months	
Target area (project locations and context) Naruan Micro Catchment is located in the upstream of Keduang Watershed, The Upper Bengawan Solo River Basin. Administratively, it is situated in Wonogiri and Karanganyar Districts, Central Java. The microcatchment is divided in 3 villages i.e Bubakan, Wonorejo, and Wonokeling (see: Annex A.)	

Total budget(USD)	**Expected APFNet grant(USD)**	**Counterpart contribution (USD)** (in cash and in-kind)
242,783	**97,927**	**144,856**

Project summary:

(1) Problems/issues to be addressed

Watershed management in Indonesia still has many obstacles. Many environmental problems in the watershed, such as floods, droughts, landslides and sedimentations show the less successful watershed management, especially at the operational level.

Sedimentation issues also become concern in the management of Multipurpose Reservoir of Gajah Mungkur (MRGM) of Wonogiri District. The issue has become a national issue, because the reservoir MRGM has a strategic function as a flood control in the Upper Solo watershed, as suppliers of agricultural water in many districts in the downstream, and as electricity powerplan.

Among the 18 river that goes into MRGM, the Keduang River is the river which has the largest watershed area, as well as the largest contributor of sediment. JICA's study showed that in the period of 1993-2004, the average sediment that has flowed to MRGM was 3.18 millions $m^3.y^{-1}$. The biggest sediment contributor was Keduang Waterhed that was approximately 1.22 $m^3.y^{-1}$ or about 33% of total sediment (Rahman, et al., 2011). Moreover, Tjakrawarsa & Pramono (2012) revealed that in the period of 1994-2002 sediment loaded in Keduang River was about 29.36 $ton.ha^{-1}.y^{-1}$ and in the period of 2009-2010 it increased to 45.41 $ton.ha^{-1}.y^{-1}$. Sutrisno et al. (2011) predicted soil erosion of Keduang Sub Waterhed using USLE model, and the result showed that soil erosion in Keduang Sub Watershed was about 44.00 $ton.ha^{-1}.y^{-1}$ or 1.9 millions $ton.y^{-1}$. These erosion value was equal to 164,000 $ton.y^{-1}$ of sediments. Other study resulted by Rahman et al., (2012) using AVSWAT model revealed the total erosion of Keduang Sub Waterhed was 172.24 $ton.ha^{-1}.y^{-1}$. or equal to 1.15 millions $ton.y^{-1}$ of sediments. This erosion value was higher than that of the previous study.

The high rate sedimentation cause in MRGM was the high rate of soil erosion in the catchment area, especially from Keduang Watershed. This was a result of land cover condition which was lack of forest cover. Based on the landcover analyses using 2011 Landsat 7 ETM, forest cover in the area was only 2.25% of the total area. The condition was worsen by the behavior of people who are paying less attention to soil and water conservation in managing their land. The high rate of population led to population pressure on land resulting in excessive use to land, and this might trigger land degradation.

At the operational level, land use planning in watershed management activities have not been going well. Yet their example at operational scale used as a reference. This is the challenging situation that migh be solved.

(2) Objectives and goal(s),

The objective of this project is to develop participatory management of micro catchment based on soil and water conservation principles. The goal is to build a model of successful watershed management at the operational level (micro catchment). This model may be used as an example of the successful watershed management to be applied in other micro catchments.

(3) Expected outputs/outcomes and key activities

The expected outputs/deliverables of this project are:

a. Potential and vulnerability of micro catchment (already obtained)
b. Micro catchment management plans (already developed)
c. Increased stakeholders commitment for effective participatory management of micro catchment
d. Formulation of integrated participatory management of micro catchment
e. Demonstration plot of conservation farming and watershed rehabilitation
f. Enhanced community awareness in management of micro catchment
g. Monitoring & Evaluation (M & E) of watershed performance within scale of micro catchment, landscapes and household

The key activities are:

a. Identification of issues and problems, and the potential vulnerability of micro catchment
b. Focus Group Discussion (FGD), coordination and dissemination with stakeholders
c. Technical plan preparation of micro catchment management, including the design of land rehabilitation and conservation of soil and water, planning of institutional empowerment and reinforcement techniques as well as inter-sector coordination;
d. Implementation of micro catchment management, including the development of conservation farming demonstration plots (incentive), forest and land rehabilitation activities, applications of soil and water conservation measures, community empowerment and dynamics of farmer groups.
e. M & E on the performance of micro catchment

(4) Target group

The project will cope the problems related to the agriculture, and soil and water conservation. That's why the project will be targeted to farmer groups, village government officers, and extension agents.

(5) Potential beneficiaries and main stakeholders

The potential beneficiaries and main stakeholders of the project are local community, central governments (the Directorate General of Watershed Controlling and Protection Forest-PDASHL, and Extension and Human Resources Development Agency-BP2SDM, Ministry of Environment and Forestry-MEF), local governments (district sector agencies), watershed management practitioners (private sectors, state-owned enterprises BUMN or BUMD), and scientific community (researchers and universities).

(6) Methodology and approaches

This project is an action research using micro catchment as a management unit that includes planning, implementation, monitoring and evaluation of watershed's performance. Micro catchment management planning will be done comprehensively through the identification of issues and problems, and also the potential vulnerability of watersheds that include hydrology, land use and socio-economic institutions aspects, and it is followed by the preparation of participatory planning. Planning process is undertaken collaboratively by involving all relevant parties (stakeholders) in watershed management, where the local communities as the main actor.

M&E is conducted using the existing Criteria and Indicators (C&I) covering water, land and socio-economic-institutional aspects, and it is performed in the micro watershed scale, landscapes and household.

7) How the project could be sustained

Some approaches will be used in order to ensure the sustainability of the project:

a. Communicating and consulting to various stakeholders on the project site, through FGD involving all concerned parties in micro catchment management
b. Assigning committed personnels from each stakeholders to be part of the team to improve sense of responsibility to the whole project processes
c. Encouraging stakeholders to be actively participate in the implementation of the project
d. Conducting workshop to validate the newly revised or redesigned monitoring system and techniques, regulation, guidelines and manuals
e. Exposing and disseminating the project output to all stakeholders and local community

Project Proponent(s):
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Abbreviations and acronyms

BP2SDM : Extension and Human Resources Development Agency

BPDASHL : Institute of Watershed Controlling and Protection Forest

BUMN : State Company

BUMD : Local District Company

C&I : Criteria and Indicators

FORDIA : Research, Development and Innovation Agency, Ministry of environment and Forestry on Indonesia

MEF : Ministry of Environment and Forestry

M&E : Monitoring and Evaluation

MRGM : Multipurpose Reservoir of Gajah Mungkur

PDASHL : the Directorate General of Watershed Controlling and Protection Forest

RPJM : Medium-Term Development Plan

WMTC : Watershed Management Technology Center

Project details

1. Background and Rationale

In the field, the implementation of watershed management is not easy to do. This is due to the many parties involved. Each have their own interests that may not aligned with each other. Moreover their activities may not on the right targets because it is not based on the actual and factual field condition. Until now, integration of watershed management is still very difficult to do, so it can still be said watershed management have not been successful. Instead of improving the condition of the watershed but land degradation frequently occur in the watershed due to mismanagement. It is showed by the more degraded watershed in the list that need to be restored.

Therefore, it is necessary to integratively manage the management of various sectors from upstream to downstream by considering the various interests, biophysical and socio-economic existence. Action research at the operational scale is necessary to develop demonstration plots of micro watershed management by means of participatory and collaborative managements based on the principles of soil and water conservation. The resulted demonstration plots may be used as an example of proper watershed management.

This project is located in Naruan Micro Catchment, upstream part of Keduang Watershed, The Upper Bengawan Solo River Basin. This site has a strategic role because it is in the catchment of MRGM which serves as the Solo River flood control, sediments storage, providers of agricultural raw water to the downstream area, as well as for electricity powerplan. The micro catchment also became a national priority target areas of rural development.

.Preliminary studies have been conducted, including the identification of issues / problems in the main study area. The main issue in the study area is soil erosion, which contributes to the high rate of sedimentation in MRGM. This may due to the land use that is not in accordance with its capability. Open minded community which are willing to support soil and water conservation activities is one of the social capital. Other potential capital are the supportive government officials from the village level until the district level.

Participatory management plans for the area have already been arranged. Plan draft contains the indicative area that should be rehabilitated as well as community development plans and coordination mechanism between the parties. The next stage of the activities include: building commitment among actors of watershed management to support effective participatory management, formulation of integrated participatory management for micro catchment scale, development of conservation and rehabilitation demonstration plots, building community awareness toward micro watershed management, as well as building the M&E performance of micro catchment, landscape and households scale.

The project is expected to (1) improve the quality of the environment by increasing forest cover, so as increasing the quantity and quality of water resources as well as reducing the rate of erosion and sedimentation to MRGM, (2) increase people's incomes by the diversification of their farm commodities, improvement of soil and water conservation technology and development of creative small businesses based on natural resources, and (3) increase capacity building and the awareness in managing and conserving natural resources.

The project is relevant to the one of APFNet priority activity namely "Improving forest management to reduce forest loss and degradation", included in project category "Demonstration Projects". Location of the project is the upstream of Bengawan Solo River Basin which is the one of 108 priority watersheds that should be restored in medium-term development plan (RPJM) of 2010-2014, and it is also included in 4 super priority watersheds that should be restored until the year of 2019. This project supports the national priority of food sovereignty and rural region development, especially in Priority Program of Natural Resources Management and Sustainable Environment. Activities of the project are in accordance with the priority activities of MEF namely (1) irrigation rehabilitation, upper watershed rehabilitation, dam and small dam development, and (2) strengthening the capacity of rural communities and indigenous peoples in the utilization of natural resources, environmental management and appropriate technology.

2. Goal and Objectives

The goal of the project is to build a model of successful watershed management in accordance with soil and water conservation principles at at the operational level (micro catchment). This model may be used as an example for the Institute of Watershed Controlling and Protection Forest (BPDASHL), and other institution associated with watershed management, from the planning, implementation to the monitoring and evaluation processes. The developed model may become a prototype applied on the broader scale.

The objective of this project is to develop participatory management of micro catchment based on community participation and stakeholder collaboration, considering the soil and water conservation principles. The well managed micro catchment may improve environmental services such as water sustainability and land productivity as well as community welfare.

3. Outputs and Strategic Activities

The expected outputs and activities outputs of this project are:

Output 1. Potential and vulnerability of micro catchment (already obtained, 2015)

Output 2. Micro catchment management plans (already developed, 2016)

Output 3. Increased stakeholders commitment for effective participatory management of micro catchment

Activity 3.1. FGD to synchronize of stakeholders perception related to watershed management and soil and water conservation

There will be 2 FGD's by mean of meeting which are farmers meeting and institutional meeting. First FGD will be held in 3 villages (Wonorejo, Wonokeling and Bubakan). FGD in each village will be conducted 2 times and attended by 50 participants. The participants are land owners or farm workers in the project area. The second FGD will be held in 2 districts (Wonogiri and Karanganyar). FGD in each district will be conducted 2 times and attended by 20 participants. The participants consist of local institutions (BPDASHL, Bappeda, Local sectoral institutions, Extension agent, NGO's, Village government). The outputs of FGD are the common perception and commitment related to the importance of sustainable watershed management. Besides that, the team and the projects consultans (PC) will participate as facilitators during FGD.

Activity 3.2. FGD to design participatory micro catchment management plan

The same as above, the different is in the output. The farmers FGD will produce design of micro catchment management, including what, who, where and when related to any soil and water conservation in the area. The institutional meeting will result in the commitment of all stakeholders (government institution/officers) to support activities in implementing the design according to the duties and functions of each institution.

Output 4. Formulation of integrated participatory management of micro catchment

Activity 4.1. FGD to develop participatory demonstration plot

The participants of the meeting are land owners or farm workers whose their land are selected for the project activities in 3 villages. We named them field partners (FP). The meeting will be held once in each village and will be attended by 50 FP's in each meeting. The meeting will produce the detail planning of sustainable farming system. The design will be more detail compare to the output of Activity 3.2 above.

Activity 4.2. Workshop with all stakeholders

The workshop will be held once in 2 districts. Each workshop will be attended by 30 persons representing stakeholders (government institution/officers) and FP's. The output of the meeting are the commitment of each party to support the activities according to the duties and functions of each institution.

The plots will be mapped based on the field measurement (land boundary, slope, soil depth, etc.). the team and FP's will work together to map the plots. Field measurement will be conducted in every land parcel. The selected parcel mainly are potential degraded dry land which are accessible and visible.

Output 5. Demonstration plot of conservation farming and watershed rehabilitation

Activity 5.1. Determining the site of demonstration plot

The plots will be mapped based on the field measurement (land boundary, slope, soil depth, etc.). the team and FP's will work together to map the plots. Field measurement will be conducted in every land parcel. The selected parcel mainly are potential degraded dry land which are accessible and visible.

Activity 5.2. Applying vegetative soil conservation measures

Vegetative soil conservation measure will be applied on approximately 125 ha distributed in 3 villages. Agroforestry pattern will be applied consist of woody plants, multy purpose trees species (MTS), herb and fodder grass. The tree composition depends on the output of Activity 4.1.

Activity 5.3. Applying civil technique soil conservation measures

Approximately 30 units gully plug, 4 units small checkdam will be build. The site of these conservation measures depend on the Output of Activity 5.1

Output 6. Enhanced community awareness in management of micro catchment

Activity 6.1. Community extension related to conservation farming system

Field extension will be held 3 days and attended by 30 FP's. The topics of the extension are land rehabilitation, soil and water conservation. The team and project consultants will facilitate the field extension.

Activity 6.2. Excursion to a farm land which applying sustainable farming system

Excurtion will be held in 2 objects. Firts object is integrated farming system in Magelang district and the second is livestock management and waste treatments in Sukoharjo district, Central Java. Each object will be attended by 30 persons in a day.

Output 7. M&E of watershed performance within scale of micro catchment, landscapes and household

Baseline data was collected in 2015 and 2016 by research team of BPT2TPDAS (see Output Activity 1. and 2.).

Activity 7.1. Water yield and sedimentation monitoring

The equipment used in this activities are rain recorder, water level recorder and sediment collectors. All the equipment are already installed in the area by BP2TPDAS. The output of this activities are monitoring report and its analyses related to water and sediment yield.

Activity 7.2. Land evaluation (land cover, soil erosion rate)

Land evaluation will be held through calculation of soil erosion rate based on based on the change in land cover resulted by the project. The calculation will use USLE equation.

Activity 7.3. evaluation of economic and community behavior on land management

The evaluation will find out benefit cost of farming system, community participation level and community behavior. The evaluation will be held through observation, interview and farm records. This data collection will be conducted based on planting season.

Output 8. Final report and disseminations

Activity 8.1. Meeting to share the project outcomes

The meeting will be conducted once with 20 participants. The participants of the meeting are team, project consultant and stakeholders.

Activity 8.2. Formulating final report and developing dissemination materials

- Final report will be printed 10 exemplars each year
- Four leaflet topics will be produced and printed 100 exemplars each topic
- Four poster topics will be produced and printed
- CD of all project activities documentation will be produced 50 pieces

4. Risks and assumptions

Participatory management is the management that involves all stakeholders. In this concept, the parties must be proactive and be able to determine for themselves the role they will take, including the risk (positive or negative) that they will encounter. Some of the risks that will arise and how to resolve it as follows:

(1) Equality of the parties

In participatory management, equality of all parties is a must. It is very often that participation turns into mobilization while volunteer engagement becomes forced participation. Sometimes

researchers and also other stakeholders often impose the will to farmers, so farmers become powerless. To resolve this issue, all stakeholders must be well informed about the subjects, the two-way communication line should be developed so that a fair decision can be made to accommodate the interests of many parties. For those who have not agreed, they may be given sufficient time and not to be forced.

(2) The involvement of the parties

Often the parties are still doubt to accept the given innovation. This will lead to the involvement of the parties less than the maximum. This problems can be solved by providing the opportunity to stakeholders to play an active role in the planning, implementation, and monitoring-evaluation phases. Further, the farmer communities will be encouraged to enhance their capabilities and knowledge, through excurtion to the regions with the same physical conditions which have already introduced sustainable agriculture.

(3) Natural disasters

Risks that may occur are natural disasters, such as landslides, drought, pests and diseases, looting, etc. To anticipate this situation, the community are prepared to be independently able to repair and maintain the demonstration plots, assisted by the project team during the project.

(4) Continuity of Funding

Financing is one element that is crucial, both in its adequacy and sustainability. Therefore, from the beginning it is necessary to build commitment to the community that the financing of this project is only an incentive to support independent soil and water conservation.

5. Human Resources and capacity assessment

Human resources with different expertise will required to run the project. Every expert has different responsibilities as follows.

Table 5.1. The project staff and managements

No	Name	Expertise	Responsibilities	Duration of employment
1.	Dr. Agung Budi Supangat	Forestry, Watershed Hydrology	Project coordinator & formulator for operational activities. National Expert for activities: 4.1, 4.2, 5.1-5.3, 6.2, 7.1	Full time
2.	Dr. Nining Wahyuningrum	Forestry, Soil & Water Conservation, Mapping (GIS)	National Expert for the implementation and execution of activities: 4.1, 4.2, 5.1-5.3, 6.2, 7.2	Full time
3.	Ir. Syahrul Donie, M.Sc.	Rural Sociology	National Expert for the implementation and execution of activities: 3.1, 3.2, 4.1, 4.2, 5.1, 6.1, 6.2, 7.3	Full time

4.	Ir. Purwanto, M.Sc.	Natural Resources Economic	National Expert for the implementation and execution of activities: 3.1, 3.2, 4.1, 4.2, 5.1, 6.1, 6.2, 7.3	Full time
5.	Dr. Dewi Retna Indrawati	Community Development	National Expert for the implementation and execution of activities: 3.1, 3.2, 4.1, 4.2, 5.1, 6.1, 6.2, 7.3	Full time
6.	Project Secretary (Dody Yuliantoro, BSc.Ag.)	Having background in secretarial works at least 3 years	Assisting the Project Coordinator on day to day administration activities, filling document, preparing data and draft report outline. Prepare progress report.	Full time
7.	Administration Staff (Bambang Subandrio, BSc.F)	Having background in financial works for at least 5 years	Assisting Project Coordinator in project financial matters, evaluate and record the budget related the program execution. Prepare progress report.	Full time
8.	National consultant	Soil & water conservation	Giving assistance and advice in project implementation in accordance with their expertise	Part time
9.	National consultant	Social economic	Giving assistance and advice in project implementation in accordance with their expertise	Part time

The project implementation requires cooperation from some institutions as supporting and executing partners. These institutions are not only from central but also local government (regency, districts, village), private sectors, and local community. The role of each institution as follows.

Table 5.2. The related stakeholders of project and their responsibilities

No	Stakeholders	The role in the project
1.	WMTC of Solo (researcher)	The project proponent The leading institution in the project implementation
2.	BP2SDM	Focal point Users of the project result
3.	BPDASHL Solo	Part of the project implementation from planning, implementation, monitoring and evaluation, and supervision. Users of the project result and technology
4.	Local community/farmer groups	Target groups Operational implementer of project activities
5.	District and Village Government	An intermediary institution between research team with community

6.	Regional Planning and Development Agency (Bappeda) Wonogiri and Karanganyar District	A regional planning agency that involve in planning of integrated participatory management of micro catchment to be synchronized with Bappeda work plan.
7.	Local Sectoral Institutions in Wonogiri and Karanganyar District	Local technical institutions that involve in the project implementation from planning to evaluation in accordance with their job descriptions
8.	Government Technical Institutions	Part of the project implementation from planning, implementation, monitoring and evaluation, and supervision Users of the project result and technology
9.	Extension agents in Wonogiri and Karanganyar District	An intermediary agents between research team with community Community assistant during the project implementation from planning up to the project evaluation
10.	Private sectors	Financial contributor in project implementation through Corporate Social Responsibility activities Business partners in agricultural product marketing

Chart of stakeholders role in every step of project implementation is presented in Annex C.

6. Budget, funding resources and financial management

Project budget is contsructed in two ways, i.e by activities and by categories. They are presented in Annex D and E. Activities based budget includes 14 activities supporting 6 outputs. Eight activities will be conducted in 2017, 8 activities in 2018 and 2 activity in 2017 and 2018. In the first year (2017) the amount of the proposed activities budget to APFNet is USD 44,488 with the contribution of counterpart (MEF) is USD 5,800. In the second year (2018), it will be USD 39,495 with the contribution of counterpart is USD 3,840.

The proposed budget by category includes 10 components. The total proposed budget for APFNet is USD 97,927 consiting of USD 50,824 (2017) and USD 47,104 (2018) while the total contribution of counterpart is USD 144,856, USD 73,408 (2017) and USD 71,448 (2018).

The project will be conducted by colaboration and participation with local community and also the stakeholder in the field. Therefore, the important aspect to be achieved by the end of the project is the independent local community. The project will encourage the contribution of local community in the form of land and labor cost, the local governernments (local sectoral indtitutions) and private sector according to their interest.

7. Monitoring and evaluation

Four key indicators are used to monitor and evaluate the achievement of project objectives. Those are biophysical, social, economic and institutional indicators. Criteria for biophysical indicator are enhanced land cover, reduced flow coefficient, decreased sediment, reduced soil erosion, increased organic matters, and increased crop yield. Criteria for social indicator are improved understanding of soil and water conservation, improved community behavior in soil and water conservation, and increased community participation. Criterion for economic indicator

is increased community income from agricultural sector. While criteria for institutional indicator are improved farmer group dynamic and increased integrated activities of water and soil conservation.

The successful micro catchment management is indicated by the change in the value of criteria as described in Table 7.1.

Table 7.1. Criteria for successful micro catchment management

Indicator	Criterion	Verifier
Biophysical	- Enhanced land cover - Reduced flow coefficient - Decreased sediment - Reduced soil erosion - Increased organic matters - Increased crop yield	30% after 5 years 10% after 2 years 15% after 2 years 30% after 5 years 5% after 5 years 20% after 2 years
Social	- Improved understanding of soil and water conservation - Improved community behaviour in soil and water conservation - Increased community participation	- People who apply soil and water conservation increase 10% - Community self reliance in soil and water conservation activities increase 10% - Community participation in farmer group activities rise 10%
Economy	Increased community income from agricultural sector	12%
Institution	- Improved farmer group dynamic - Increased integrated activities of water and soil conservation	- Administrative requirements for farmer group (articles of farmer group and bylaws, work plan, organizational structure) - Decision making process is done democratically - Type and quantity of proposed activities from farmer group increase - Area and frequency of soil and water conservation activities increase

8. Dissemination and sustainability

Outputs of the project that will be communicated are: 1) base line data of Naruan Micro Catchment, 2) participatory planning process of Micro Catchment management, 3) participatory planning document of Naruan Micro Catchment management, 4) Implementaion of Naruan Micro Catchment management such as development of demonstration plot and community empowerment, 5) monitoring and evaluation of the performance of Naruan Micro Catchment management.

Base line data will be presented in the form of a leaflet which contains the vulnerability of land and hydrological, also social, economic, and institutional conditions. Participatory planning process of Micro Catchment management will be communicated through APFNet Website, social media and a leaflets. The planning of Naruan Micro Catchment management will be documented in the form

of book and distributed to APFNet and stakeholders for instance BP2SDM, BPDASHL, BAPPEDA, farmer groups etc. Leaflets, newsletters and APFNet Website will be used to share implementation process of Naruan Micro Catchment management (community empowerment and demonstration plot development), while monitoring and evaluation of the performance of Naruan Micro Catchment management will be informed through leaflets, blogs and APFNet Website. All documents will be supported with photos, videos and maps. At the end of every fiscal year, technical books report are made and will be contributed to the focal point, high level institution, and main related institutions.

Target audience of the communications are: focal point (BP2SDM), Directorate General PDASHL, public who interested on soil and water conservation and watershed management, local governments, students with subjects on environment, forestry, or civil engineering concentration, etc. (Annex F.).

At the end of the project, a model of Naruan Micro Catchment management, which is properly planned, participatory implemented, and well monitored, will be obtained. Institutional of Naruan Micro Catchment management is also build during the project implementation. For the sustainability of Naruan Micro Catchment management, community are expected already have self reliance in applying water and soil conservation, also in social, economic and institutional development. Besides of that, WMTC will conduct a workshop with stakeholders and hand over responsibility of demonstration plot management to local government i.e. Wonogiri dan Karanganyar Districts. However, WMTC will continue the research activities.

Annex A: Project sites map and relevant information

Project is located in Naruan Micro Catchment, upstream part of Keduang Watershed, The Upper Bengawan Solo River Basin (Figure 1). This site has a strategic role because it is in the catchment of the MRGM. The MRGM was built in 1970 which serves as the Solo River flood control, sediments storage, as well as providers of agricultural raw water to the downstream area. At the beginning of construction, the reservoir has a maximum capacity to store sediment by 120 million m^3 (assuming the rate of sedimentation in the reservoir is an average of 2 mm / yr).

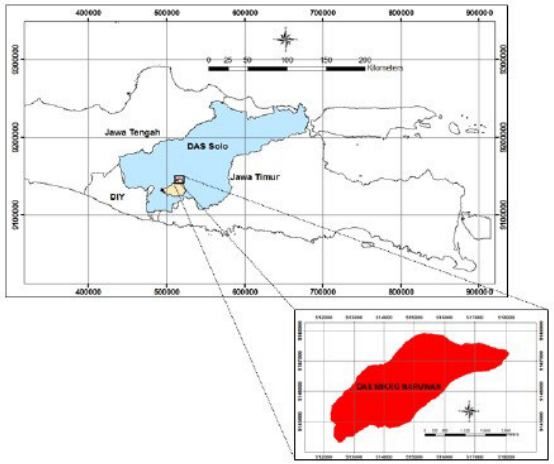


Figure 1. Project location

Among the six catchment in MRGM, Keduang Watershed becomes the greatest sediment contributor to these reservoir, so Keduang Watershed becomes one of the priority watersheds that should be handled in upper Solo River Basin management. Many studies reported that there are severe soil erosion and sedimentation. Solo River Basin is one of the 108 priority watersheds that should be restored in medium-term development plan (RPJM) of 2010-2014, and it is also included in 4 super priority watersheds that should be restored until the year of 2019.

In the context of socio-economic development, the project area includes the Karanganyar and Wonogiri Districts, Central Java Province, Indonesia. These districts are the priority targets of national development of rural and rural region development (Pembangunan Desa dan Kawasan Perdesaan) through land productivity improvement by the development of an integrated conservation farming (agriculture-forestry-livestock), which involves the local economic potential and natural resources that exist in the village, as well as community capacity building (empowerment).

Annex B: Project logical framework

Items	Intervention logic	Objectively verifiable indicators of achievement[5]	Sources of information and means of verification[6]	Assumptions[7]
Goal	To build a model of successful watershed management at the operational level (micro catchment), as a prototype to be applied on a wider scale watershed	- Improved implementation of watershed management at the operational level - Improved environmental services provided by catchment - Improved related regulation	- Reports of MEF and FORDIA - Reports of Local Government	Local Government and relevant stakeholders consistently support the implementation of project results
Objectives[2]	To develop participatory management of micro catchment based on community participation and stakeholders collaboration, with attention to the rules of soil and water conservation	- Adopted participatory planning of micro catchment - Well established coordination accross institutions - Increased number of forest cover - Increased number of soil and water conservation practices	- Reports of MEF and FORDIA - Provincial reports - Reports of Local Government - Project Reports	All relevant stakeholders willing to participate in the project implementation
Expected outputs[3] **Output 1**	Potential and vulnerability of micro catchment (already obtained)	- Recorded and mapped potential problems and formulated main issue in project area of micro catchment - Recorded and mapped vulnerability of micro catchment, i.e.critical land, land slide, water potency as well as socio-economic and local institution	- Project Report - Field survey report - Documentations	- Strong support of involved institutions - Local community willing to participate - Catchment areas is accessible for data collection
Output 2	Micro catchment management plans (already developed)	- Indicative planning of micro catchment management	- Project Report - FGD reports - Workshop reports - Documentations	- Strong support of involved institutions - Local community willing to participate

Annex B: Project logical framework

Output 3	Increased stakeholders commitment for effective participatory management of micro catchment	- Synchronized stakeholders perseption related to watershed management and soil and water conservation. - Increased stakeholder's commitment in microcatchment management	- Project Report - Workshop report - Field survey report - Documentations	- Strong support from involved institutions - Local community willing to participate - Catchment areas is accessible for data collection
Activity 3.1	- Focus Group Discussion (FGD) to synchronize stakeholders perseption related to watershed management and soil and water conservation.	- FGD	- Documentation - Reports	- All parties actively partipate during the activities
Activity 3.2	- FGD to design participatory microcatchment management plan	- FGD	- Documentation - Reports	- All parties actively partipate during the activities
Output 4	Formulation of integrated participatory management of micro catchment	- Definitive planning of micro catchment management - Design of soil and water conservation measures including vegetative and civil technique: type, volume, site, personel	- Project Report - Workshop report - Field survey report - Documentations	- Strong support of involved institutions - Local community willing to participate - Catchment areas is accessible for data collection
Activity 4.1	- FGD to develop participatory demonstration plot	- FGD	- Documentation - Reports	- All parties actively participate during the activities
Activity 4.2	- Workshop with all stakeholders	- Workshop	- Documentation - Reports	- All parties actively participate during the activities
Output 5	Demonstration plot of conservation farming and watershed rehabilitation	- Delineated demonstration plot border including its attributes - Vegetative soil and water conservation measures in the	- Project Report - Field survey report - Documentations: photo and video	- Strong support of involved institutions - Local community willing to participate - Catchment areas is

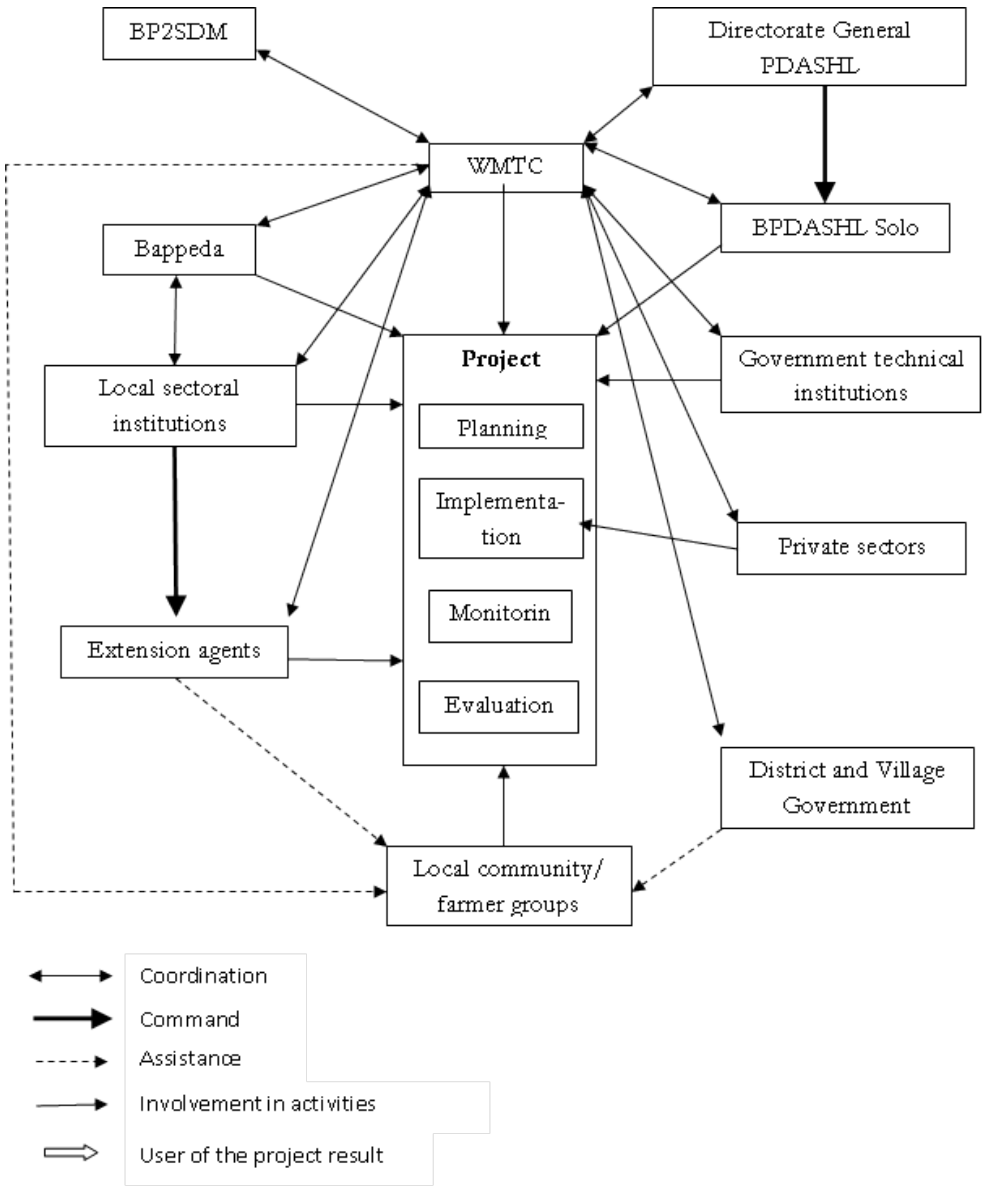
Annex B: Project logical framework

		form of agroforestry & agrosilvopasture - Civil technique soil and water conservation measures in the form of small check dams and small gully plugs		accessible for data collection
Activity 5.1	- Determining the site of demonstration plot	- Demonstratiom plot site	- Project Report - Field survey report - Documentations: photo and video, maps	Farmer groups are willing to participate by providing their land and labor
Activity 5.2	- Applying vegetative soil conservation measures	- Vegetative soil conservation measures	- Demonstration plot - Documentations: photo and video	Farmer are willing to participate by providing their land and labor
Activity 5.3	- Applying civil technique soil conservation measures	- Civil technique soil conservation measures	- Demonstration plot - Documentations: photo and video	Farmer are willing to participate by providing their land and labor
Output 6	Enhanced community awareness in management of micro catchment	- Increased communty awareness on the importance of watershed management - Increased ability of communities on soil and water conservation - Increased communities knowledge on sustainable farming and preparing project proposals	- Project Report - Workshop report - Documentations: photo and video	- Strong support of involved institutions - Local community willing to participate
Activity 6.1	- Community assistency and extention related to conservation farming system	- Improved farmers group dynamics - Increased extention frequency	- Farmer groups - Documentations: photo and video	- Cooperative works between farmers, extention agents and researchers
Activity 6.2	- Excursion to a farm land which applying sustainable farming system	- Improved knowledge on sustainable farming - Improved awareness	- Farmer groups - Documentations: photo and video	- Cooperative works between farmers, extention agents and researchers

Annex B: Project logical framework

Output 7	M & E of watershed performance within scale of micro catchment, landscapes and household	- Precipitation, river discharge, sediment discharge, and water quality data - Land cover, soil erosion, soil fertility, and crops yield data - Community income, organisation activities, and articles of farmer group data	- Project Report - Field survey report - Documentations: photo and video	- Strong support from involved institutions - Local community willing to participate - Catchment areas is accessible for data collection
Activity 7.1	Water yield and sedimentation monitoring	- Increased water yield, and decreased sedimentation	- Field data	
Activity 7.2	Land productivity evaluation (land cover, soil erosion rate, SOM)	- Enhanced land cover - Drecread soil erosion rate - Increased SOM	- Field data	
Activity 7.3	Evaluation of economic and community behavior on land management	- Increased community income - Improved community behaviour in soil and water conservation	- Field data	
Output 8	Final report and disseminations	- Reported all project activities - Disseminated the project output	- Project Report - Documentations: photo and video - Dissemination materials	- Strong support from involved institutions - Local community willing to participate
Activity 8.1	Meeting to share the project outcomes	- Feedback from stakeholder and consultant	- Documentation - Reports	
Activity 8.2	Formulating final report and developing dissemination materials	- Final report - Leaflet - Poster - CD	- Documentation - Reports	

Annex C: Project organizational chart



Annex F: Communication strategy template

Communication strategy

Objectives	Target audience	Key message	Communication tools	
			Products/Tools	Media/Channels/Activities
Project objective				
1. To develop participatory management of micro catchment based on soil and water conservation principles	Focal point: BP2SDM High level stakeholders: PDASHL; Local governments, Public interested in watershed management and soil and water conservation, and students who learn environment subject, forestry, civil engineering, etc,	Management of micro catchment based on soil and water conservation principles	Well managed micro catchment, Research finding, and success story of the project, accompanied with photos and videos,	APFNet Website, Leaflet, final report, blog, newsletters, etc,
Communication objectives				
1. Stakeholders aware of the problems of Naruan Micro Catchment	Focal point: BP2SDM High level stakeholders: PDASHL; Local governments, Public interested in watershed management and soil and water conservation, and students who learn environment subject, forestry, civil engineering, etc,	Problems encountered in managing Naruan Micro Catchment	Information related to problems in managing Naruan Micro Watershed, methods to solve the problems	Leaflet and APFNet Website
2. Stakeholders find out Participatory Management Planning of Naruan Micro Catchment	Focal point: BP2SDM High level stakeholders: PDASHL; Local governments, Public interested in watershed management and soil and water conservation, and students who learn environment subject, forestry, civil engineering, etc,	Naruan Micro catchment Participatory Management Planning	Information of Naruan Micro catchment participatory Management Planning	Newsletters, Leaflet, and book,

Annex F: Communication strategy template

3. Stakeholders find out the stages of Naruan Micro Catchment Participatory Management	Focal point: BP2SDM High level stakeholders: PDASHL; Local governments, Public interested in watershed management and soil and water conservation, and students who learn environment subject, forestry, civil engineering, etc,	The stages of Participatory Management	Information about the stages of Participatory Management	News letters
4. Stakeholders find out final result of Naruan Micro Catchment Participatory Management	Focal point: BP2SDM High level stakeholders: PDASHL; Local governments, Public interested in watershed management and soil and water conservation, and students who learn environment subject, forestry, civil engineering, etc,	Final result of Naruan Micro Catchment Participatory Management	A model of Well Managed Micro Catchment and final report	News letter, Report,
5. Stakeholders able to monitor and to evaluate Naruan Micro Catchment Management	Local government, BPDASHL Solo, WMTC	Methods to monitor and to evaluate, criteria, and indicators of well managed microcatchment	Hand book, leaflet	Book, leaflet

Annex F: Communication strategy template

Workplan and budget for communication strategy

Activities (what)	When	Who	Estimated budget
Development and production of communication tools/products	January – March 2018	Researchers Team	-
Pretesting of tools/products	April 2018	Researchers Team	-
Production of tools/products	April 2018	Printing Agency	3,500
Dissemination of tools/products	Mei – Nov 2018	Researchers Team	-
Monitoring and evaluation	Mei 2017 – dec 2018	Researchers Team	-
Etc.			

Annex F: Communication strategy template

Monitoring and evaluation of communication strategy

Communication objectives	Success indicators	What information to collect	How to collect information	Who will collect the information	When to collect information
1. Potential and vulnerability of micro catchment (already obtained)	Information of potential and vulnerability of micro catchment	Vulnerability of land, hydrology, social economic and institutional conditions	Desk analysis and survey	WMTC team	2015
2. Micro catchment management plans (already developed)	Indicatif planning of micro catchment management	1. Planning of vegetative and civil technique activities 2. Institutional empowerment	Desk analysis and survey	WMTC team	2016
3. Increased stakeholders commitment for effective participatory management of micro catchment	1. Focus Group Discussion (FGD) to synchronize stakeholders perception related to watershed management and soil and water conservation 2. FGD to design participatory micro catchment management plan	1. Attendance of FGD participant 2. Note of FGD 3. Reports and documentation	Recording and discussion	WMTC team and stakeholders	2017
4. Formulation of integrated participatory management of micro catchment	1. FGD to develop participatory demonstration plot 2. Workshop with all stakeholders	Soil and water conservation activities (types, volume, location and actors)	Desk analysis, survey, FGD, and interview	WMTC team and local community	2017
5. Demonstration plot of conservation farming and watershed rehabilitation	1. Determining the site of demonstration plot 2. Applying vegetative soil conservation measures 3. Applying civil technique soil conservation measures	1. Demonstration plot of soil and water conservation (types, volume, location and actors) 2. Biophysical and social economic data	Building demonstation plot	WMTC team, local community, and stakeholders	2017-2018

Annex F: Communication strategy template

6. Enhanced community awareness in management of micro catchment	1. Community assistency and extention related to conservation farming system 2. Excursion to a farm land which applying sustainable farming system	1. Frequency and material of assistance and training 2. Participation level	Observation and recording	WMTC team, local community, and stakeholders	2017-2018
7. M & E of watershed performance within scale of micro catchment, landscapes and household	1. Water yield and sedimentation monitoring 2. Land productivity evaluation (land cover, soil erosion rate, SOM) 3. Socio-economic and community behavior evaluation	1. Water and sediment discharge 2. Land cover, erosion, crop yield, and organic matters 3. Income, organization and rules of the game	Observation and recording	WMTC team and BPDASHL	2017-2018
8. Final report and disseminations	1. Meeting to share the project outcomes 2. Formulating final report and developing dissemination materials	1. Feedback from stakeholders -	Meeting	WMTC team	2017 & 2018

Annex G. Term of Reference (TOR) of National Consultant

1. Term of References for National Consultant 1

Qualification:
Expert in soil and water conservation

Minimum Requirements:

- Degree PhD.
- Understanding of watershed management process
- Experience in conducting applied research on watershed management

Responsibilities:

- Giving assistance and advices in project implementation and formulating final report in accordance with his/her expertise

Duration of employment: 2 years.
Location: Indonesia

2. Term of References for National Consultant 2

Qualification:
Expert in social, economic and institution

Minimum Requirements:

- Degree PhD.
- Understanding of watershed management process
- Experience in conducting applied research on watershed management

Responsibilities:

- Giving assistance and advices in project implementation and formulating final report in accordance with his/her expertise

Duration of employment: 2 years.
Location: Indonesia