Asia-Pacific Network for Sustainable Forest Management and Rehabilitation

PROJECT EX-POST EVALUATION REPORT

Development of Participatory Management of Micro-catchment at the Bengawan Solo Upper Watershed (Phase II) Project

[2020P1-INA]

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Contents

Acronyms and Abbreviations

APEC	Asia-Pacific Economic Cooperation
AWP	Annual Work Plan
Baperlitbang	District Planning, Research and Development Agency
BBWS BS	Bengawan Solo River Basin Organization
BP2SDM	Extension and Human Resources Development Agency
BPBD	Regional Disaster Management Services
BPDASHL	Institute of Watershed Controlling and Protection Forest
BPDASHL SOLO	Management Centre for Watersheds and Protected Forest
BPH	Forest Management Centre
BPSILHK SOLO	Institute for Implementation Standard of Environment and Forestry Instrument - Solo (ex-WMTC)
BPUSDATARU	Centre of Public Works, Water Resources and Spatial Planning
BSI-LHK	Agency for Standardization of Environment and Forestry Instrument (ex-FORDIA)
BUMN/BUMD	State-owned Enterprise/District-owned Enterprise
CDK	The Forestry Services Branch
DAS	Watershed Management Forum
EA	Executing Agency
FGD	Focussed Group Discussion
FKPWP	Forestry Researcher-Trainers-Extension Agents Communication Forum
FORDIA	Forestry Research, Development, and Innovation Agency Forum
FP	Field Partner
GNKPA	National Campaign for Water Conservation Partnership
KBR	Village nursery
MEF	Ministry of Environment and Forestry
M&E	Monitoring and Evaluation
MPTS	Multi-purpose Tree Species
MRGM	Multipurpose Reservoir of Gajah Mungkur
NMC	Naruan Micro Catchment
NGO	Non-Government Organization
OPD	Local Sectoral Institution
PDAM	District Water Services
PDASHL	Directorate General of Watershed management and Protected Forest

RHL	Forest and Land Rehabilitation
RLPS	Land Rehabilitation and Social Forestry
SWC	Soil and Water Conservation
WMTC	Watershed Management Technology Centre

Executive Summary

The "Development of Participatory Management of Micro Catchment at the Bengawan Solo Upper Watershed - Phase II Project" was a continuation of the Phase I project, implemented in the Naruan micro-catchment of the Keduang sub watershed. It was implemented by the Watershed Management Technology Centre (WMTC) of the Ministry of Environment and Forestry of the Government of Indonesia during the period from September 2020 to August 2022. The objective of the project was to implement micro catchment management by improving the available plan and extending the impact area, based on community participation and stakeholder collaboration, considering the soil and water conservation principles.

The primary objective of this ex-post evaluation was to assess the achievements, impacts, sustainability, duplicability, and scaling up potential of the Phase II project, identifying factors for success and failures. It also aimed to figure out lessons learnt, and to provide recommendations for future project planning, implementation, and management. Both quantitative and qualitative methods were employed for the evaluation which was conducted during July 2023.

Key findings and analysis

The project was in line with national priorities of Indonesia in terms of upper watershed rehabilitation, rural development, and capacity building of the locals in utilization of natural resources and environmental management. It has addressed the actual needs of the target area in terms of forest conservation and management, while contributing to the socio-economic development of local people. It was also in consistent with the APFNet's vision, mission, objectives, and priorities of multifunctional forest management and utilization as specified in its strategic plan. The project was complementary to the mandate and responsibilities of the executing agency in term of watershed management and development and implementation of standards for the environmental and forestry sectors. It is also aligned with the projects carried out by the other stakeholder agencies in the economy. The model developed by the project can be used as an example for the BPDASHL and other institutions involved with watershed management activities. The land management plan developed for the NMC under this project can be used by Indonesia District Forestry Service as a reference.

Project achievements

Project achievements were analysed against the project goal, objectives, and desired outputs.

All project activities have been completed successfully in accordance with the project design and annual work plans, within the planned period with maximum utilization of available financial provisions. However, the EA is yet to continue the post-project monitoring on water yield, sedimentation, and land evaluation of the demonstration plots of conservation farming and watershed rehabilitation (as originally planned) due to some reasons beyond their control.

Among the five desired outputs identified in the design, project has achieved two outputs completely. The achievement of the other three outputs was only partial. In this context, there was a notable weakness in the project design with regard to aligning actions against outputs in a logical manner. Although the logical framework approach has been used at the design stage, the rigorous bottom-up checking process has not adequately followed to make sure that the lists of activities and outputs are comprehensive.

With respect to the project goal and objective, it can be concluded that the project has achieved its "desired objective" and significantly contributed to realize its "set goal", despite the fact that similar shortcomings were observed in aligning them logically with actions and outputs.

Performance of Project Management

Different criteria were used to assess the performance of project management. Accordingly, it can be concluded that the overall performance of project management is satisfactory. Project has developed number of useful communication material of high quality for dissemination which can be used to replicate and upscale the model developed by the project. The project has operated under a well-structured institutional arrangement and implemented by an experienced multi-disciplinary team of professionals complemented by carefully selected consultants of relevant disciplines. However, partially due to the absence of a monitoring and evaluation framework in the project design, data sources, data collection methods, roles, and responsibilities, as well as timelines, were not specified in the project design. Post-project monitoring and evaluation to measure the log-term project impacts has become a challenge, although project has used a Logical Framework (Log Frame) as a planning tool.

Project Impacts

Project has created a significant positive impact on the awareness and understanding of the importance of soil and water conservation among the targeted community. Although it has made several efforts to create much needed integration among stakeholders to address the watershed management issues in a holistic manner, the extent to which it has achieved the success is yet to be evaluated. Taking into account the magnitude of environmental problems associated with the entire micro-catchment, the SWC measures employed by the project are insignificant and yet to create an impact on the biophysical and hydrological parameters. Similarly, it requires reasonable period of time, supplemented by continuous follow up actions, to generate anticipated positive impacts from project interventions on the livelihoods and socio-economic status of targeted communities.

Project sustainability and Duplicability

The sustainability and duplicability of project activities were assessed based on visual observations made during the field visit supported by interviews conducted with different array of respondents.

Most of the demonstration plots are likely to sustain without any additional support. There were evidence of some non-participants already starting to replicate SWC measures introduced by the project. More people are likely to follow the same when demonstration plots start to yield products.

All gully control structures are very much likely to be sustained for a reasonable period of time. Although the bamboo structures are starting to exhibit signs of decay, some of them have produced sprouts, establishing a permanent vegetative barrier across the gully. Some community members have already replicated small bamboo-based gully control structures in their landholdings.

Apiculture introduced by the project is yet to be established in the villages highlighting the need for a continuous follow up action. Both coffee and avocado promoted by the project very much suites with the site characteristics and likely to be cultivated widely in future. Interest and enthusiasm of the youth groups to start coffee processing industry in the villages is also an encouraging impact brought about by the project.

1. INTRODUCTION

1.1 Project brief

1.1.1 Project Background

Watershed management is an ever-evolving practice involving the management of land, water, biota, and other resources in a defined area for ecological, social, and economic purposes. It involves socio-economic, human, institutional, and biophysical inter-relationships among soil, water, and land use and the connection between upland and downstream areas. The integrated watershed management approach attempts to balance human and environmental needs, while simultaneously guarding ecosystem services and biodiversity.

Watershed management is reported to be a considerable challenge in Indonesia. Many environmental problems, such as floods, droughts, landslides, land degradation and sedimentation observed in the economy make the importance of implementing holistic watershed management practices obvious, especially in the highland areas.

Sedimentation has become a critical concern in the management of Multipurpose Reservoir of Gajah Mungkur (MRGM) of Wonogiri District of Central Java. The MRGM has a strategic function for flood control to protect the downstream area of Solo River. It also serves as an important water storage reservoir to supply irrigation water to the downstream agricultural lands while simultaneously generating hydroelectricity.

The high rate of sedimentation in MRGM is inevitably linked to the excessive rate of soil erosion in the upstream catchment area. Among the eighteen rivers that flow into MRGM, the Keduang River is not only the one with largest watershed area, but also the largest contributor for sedimentation. Land cover analysis conducted in 2011 using Landsat 7 ETM has reported that the forest cover in the Keduang watershed was only 2.25 percent of the total land area. The condition was worsened by the intensive agricultural practices of communities living in the upper watershed area who cultivate short-term agricultural crops with less attention paid to soil and water conservation. Furthermore, the high rate of population growth also adds pressure for excessive use of land for cultivation, triggering increased land degradation.

In response to this situation, APFNet, in collaboration with the Watershed Management Technology Centre (WMTC) of the Ministry of Environment and Forestry of the government of Indonesia, has developed a project to support participatory management of the Naruan Micro Catchment (NMC) of the Keduang sub-watershed. Consequently, the APFNet project "Development of Participatory Management of Micro Catchment at the Bengawan Solo Upper Watershed – Phase I" was launched in 2017 and implemented during the period from 2017-2019. The project has aimed to address two major problems, namely environmental problems associated with high erosion rates, and low income of communities resulted from low land productivity associated with inappropriate land use. Under the project support, participatory land management plans for the area have been developed within the framework of watershed management at micro-scale. Approximately 50 ha of participatory demonstration plots have been established with the active participation of community members. In addition, appropriate locations for the establishment of civil structures have also been identified, and 35 erosion control structures have been built, ranging from small check dams, gully plugs and a head structure made of cemented-stones, gabions, and bamboo. To support the rehabilitation activities, stakeholders who should be directly involved and those who have the potential to support have also been identified.

After the completion of project phase I, a follow-up of the project was deemed necessary, especially to expand the impacts of the activities on the community and also to improve the environmental quality. To address this need, a second phase for the project was designed and subsequently approved by APFNet. Accordingly, "Development of Participatory Management of Micro Catchment at the Bengawan Solo Upper Watershed - Phase II project" was launched in August 2020 and implemented for two more years. The project has aimed 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.

1.1.2 Target area

The Naruan Micro Catchment (NMC) is located in the upper part of the Keduang watershed of the Bengawan Solo basin. There are three villages, namely Wonorejo, Wonokeling, and Bubakan, located in the micro catchment making up nearly 100 percent of the NMC. Administratively, NMC falls within two districts, with Wonorejo and Wonokeling villages are located in Jaryoso District in Karanganyar Regency, while the Bubakan village is located in Girimarto District of Wonogiri Regency.

The general topography of the NMC consists of hilly and mountainous terrain with about 60 percent of the lands are situated in slopes ranging from 25-45 percent. Approximately 30 percent of the area has a slope greater than 45 percent. Accordingly, the micro-catchment is naturally prone to erosion hazard. An analysis carried out by Wahyuningrum and Supangat in 2016 has revealed that most of the NMC areas are in the land use capability classes VI and VII, meaning that the recommended land use practice is permanent tree cover.

As per the study carried out by the project, total land area of the NMC is 957.1 Ha. It was also reported that the majority of the lands in NMC are community-owned where most of the community members practice upland agriculture as their main livelihood strategy. Only about 20 percent of the NMC is covered with forest, which occupies primarily in the uppermost area of the micro-catchment.

The socio-economic data collected during the project has indicated that the average income of the villagers is lower than the average per capita income of the respective districts. Similarly, the average education level of the villagers in all three villages are also low, with high proportion of them not even having graduated from elementary school. The average age of the population that participated in the project activities was 52 years, which displays the high tendency of young people migrating to cities for sourcing alternative income opportunities.

1.1.3 Project Goal

As stated in the Project Proposal, the goal of the project was "to build a model of successful watershed management at the operational level (micro catchment). This model may be used as an example of successful watershed management to be applied in other micro catchments."

1.1.4 Project Objectives

As specified in the project proposal, the objective of this project was to implement micro catchment management by improving the available plan and extending the impact area, based on community participation and stakeholder collaboration, considering the soil and water conservation principles.

1.1.5 Expected Outputs

The anticipated outputs/deliverables of this project were:

a. Preparation of detailed participatory land management plans for the demonstration plots.
b. Establishment of demonstration plots of conservation farming and watershed rehabilitation.
c. Enhancement of farmers' skill and income through on-farm and off-farm activities.
d. Preparation and dissemination of information on the impacts of the demonstration plots of conservation farming and watershed rehabilitation.
e. Make recommendations and prepare a policy brief on the best agroforestry model.

1.1.6 Project execution and supervision

Project was executed by the Watershed Management Technology Centre (WMTC) of the Ministry of Environment and Forestry under the supervision of the Extension and Human Resources Development Agency. It was implemented during the period from September 2020 to August 2022.

1.1.7 Project cost

The total project cost was USD 244,702, of which APFNet has contributed USD 99,198.13. The balance has been met by the executing agency, mainly in the form of in-kind contributions.

Funding from APFNet has been used to run project activities such as covering costs of consultant fees, travel and related costs, meetings and trainings, field activities, publications and dissemination, office operation, procurement, as well as monitoring and evaluation.

Contributions from the Executing Agency (in-kind resources) has received in the form of project team salaries, some parts of field activities, and the use of office and field equipment.

1.2 Evaluation objectives

The primary objective of this ex-post evaluation was to assess the achievements, impacts, sustainability, duplicability, and scaling up potential of the Phase II project, identifying factors for success and failures. It also aimed to figure out lessons learnt and to provide recommendations for future project planning, implementation, and management.

1.3 Evaluation scope and criteria

The evaluation was primarily focussed on the aspects of project planning, implementation, and management in a comprehensive manner. It examined the relevance, coherence, effectiveness, efficiency, impacts, and sustainability, of the project activities in accordance with the specified project objectives.

The evaluation covered all project components, including performance of project activities; their outcomes and impacts against the original objectives and anticipated outputs; the communication and dissemination; management and implementation teams; consultancy inputs; and the stakeholder´s involvement.

2. EVALUATION METHODS AND APPROACHES

Both quantitative and qualitative methods were employed to conduct this evaluation. It was anticipated that when combined, both quantitative and qualitative data will provide better overview of the project.

2.1 Quantitative methods

Quantitative data were collected by reviewing of existing documents and other available data sources. To the extent possible, they were further verified during the field observations and interviews with stakeholders. Interviews were conducted face-to face using semi-structures questionnaires.

2.2 Qualitative methods

Qualitative data were collected through direct observations, interviews, discussions, as well as from written documents. They were analysed by examining, comparing, contrasting, and interpreting patterns.

Observations were used to explain behaviours as well as social context and meanings. Interviews were conducted with individuals alone and also with groups of people. All interviews were based on semi-structured questionnaires and were conducted under controlled conditions in an open-ended manner. Some interviews had a specific focus, while the others focused on the respondents' perceptions and motivations.

Where necessary, interpretation services were sought to overcome the language barrier.

Meeting with the project team

Conducting field observations

Interviews with community members

Interviews with village government officials

2.3 Limitations

Due to the remoteness of the project sites and the distance from the central location, field visits were restricted to two days. As a result, it was not possible to visit all demonstration plots and other project

related interventions. Only some selected sites were visited with the guidance provided by the project team. No systematic data collection was done during the field investigations owing to the limitations of time and resources. Only visual observations were used to make judgements on the survival and success of the project interventions.

Interviews with the village level project participants were primarily restricted to those who gathered to central locations by the invitation of the executing agency (EA). Consequently, the number of interviewees participated at the field level was significantly low (please see Annex V). None of the field level officials or project participants understood English, and therefore all questions and answers were administered through interpretation support provided by the project staff.

Absence of post-project monitoring data posed a significant challenge to assess the success and impacts of project interventions.

3. KEY FINDINGS AND ANALYSIS

3.1 Project Relevance

3.1.1 Contribution to the target region

The project was in line with priorities at the economy-level and the actual needs of the project target area in terms of forest conservation and management and contribute to the socio-economic development of local areas.

As indicated in the project reports, Bengawan Solo River Basin is one of the 108 priority watersheds that was earmarked for restoration in medium-term development plan (RPJMN) of Indonesia in periods of 2015-2019 and to be continued in periods of 2020 - 2024. This river basin has also included in the four super-priority watersheds identified to be restored by the year 2024 to mitigate soil erosion in upstream and flooding in the downstream. In addition, Keduang sub-watershed located within MRGM catchment area has recognized as one of the three priority watersheds to be conserved in the Wonogiri District medium-term development plan (RPJM) to minimize soil erosion and sedimentation of MRGM.

The project also complements with the national priority of food sovereignty and rural regional development, in the Priority Program of Natural Resource Management and Sustainable Environment. Activities of the project are in accordance with the priority activities of MOEF namely (1) irrigation rehabilitation, upper watershed rehabilitation, dam, and small dam development, and (2) strengthening the capacity of rural communities and Indigenous people in the utilization of natural resources, environmental management, with appropriate technology.

3.1.2 Contribution to APFNet priorities

The project is in consistent with the APFNet's vision, mission, and objectives. It is in line with the APFNet objectives of a) contributing to the achievement of the Asia-Pacific Economic Cooperation's (APEC) aspirational goal of increasing forest cover and b) helping to enhance forest carbon stocks and improve forest quality and productivity by promoting rehabilitation of existing but degraded forests and reforestation and afforestation of suitable cleared lands in the region. Further, it has also helped to increase socio-economic benefits of the forests.

The project was developed during the implementation period of APFNet Strategic Plan (2016 – 2020). It was in line with the APFNet Thematic Priority 1 (Rehabilitating degraded forests and increasing

forest cover), and Priority 4 (Enhancing forests' contribution to socio-economic development and improvement of local livelihoods) of the Strategic Plan (2016 – 2020).

The project also qualifies to be supported under the funding category of "Demonstration Projects" as it was expected to showcase the best practices in forest rehabilitation in a cost-effective manner and contribute to institutional capacity enhancement including planning and decision making.

The focus area of APFNet's demonstration project work of its current Strategic Plan (2021 – 2025) is on the multifunctional management and restoration of existing forests, degraded forests, and deforested lands. Since this project was expected to develop, showcase, and disseminate models and technologies for forest restoration and create synergies between conservation, development, people, livelihoods, and governments, it can be concluded that it is in line with the current strategic plan (2021 – 2025) as well.

3.2 Project coherence

3.2.1 Internal coherence

The project was executed by the Watershed Management Technology Centre (WMTC). It was functioning under the Forestry Research, Development, and Innovation Agency (FORDIA) which was under the Ministry of Environment and Forestry at that time.

WMTC, being a research and innovation institution, was mandated to conduct technological development research and innovation on watershed management. Accordingly, this project was very much within their agency mandate. The project aimed to build a model of successful watershed management at the operational level (micro catchment) through an action research project to be used as a demonstration for learning. Hence, it can be concluded that the project very well fulfils the internal coherence in relation to the executing agency.

As a result of the recent restructuring process of the government of Indonesia, WMTC has been changed to a new institution under the name of Institute for Implementation Standard of Environment and Forestry Instrument (BPSILHK). Furthermore, the Forest Research, Development, and Innovation Agency (FORDIA) in which WMTC was functioning under, has also moved to a different ministry.

The new mandate of the BPSILHK is somewhat broader and complicated than the then WMTC. As indicated in their website, BPSILHK has the task of organizing the coordination and formulation, development and implementation of standards and conformity assessment of instrument standards in the environmental and forestry sector. To carry out that task, BPSILHK is given the following functions:

a. Preparation of technical policy plans and programs for the formulation and development, as well as application of standards and conformity assessment of instrument standards in the environment and forestry sector,
b. Implementation of coordination and formulation, development, and conformity assessment of instrument standards in the environment and forestry sector.
c. Monitoring, evaluating reporting, and facilitating the application of standard instruments in the environmental and forestry sector,
d. Carrying out administrative tasks of the Standardization Agency for Environmental and Forestry Instruments; and
e. Implementation of other functions given by the Minister of Environment and Forestry.

Accordingly, the subject of watershed management is not specifically mentioned in the functions of BPSILHK. However, since it is still assigned with the tasks of development and implementation of standards in environmental and forestry sector, the project goal and objectives can still be aligned to the mandates of BPSILHK.

3.2.2 External Coherence

There are three types of organizations involved with watershed management in Indonesia. They include government institutions, institutions formed by the government whose members consist of NGOs, administrators, academics, researchers, and environmentalists and voluntary institutions formed by community members.

A review conducted by Narendra et. al. (2021) found that there are several conflicting and overlapping issues with regard to the institutional aspects of watershed management. They include hierarchical confusion, discrepancy, and asynchrony among laws and regulations, and weak participation and coordination among watershed management stakeholders.

As stated in the Ministry of Forestry Regulation No. 60/2013, watershed management planning should be tiered at the national, provincial, and district levels, and finally at the micro or implementation level. The national watershed management plan should be downgraded to the provincial and district levels. Through the provincial planning agency, each provincial government can prepare a watershed management plan in its administrative area. The mandates for implementing watershed management at the district level include, determining the locations of micro watersheds, developing management plans, and implementing, monitoring, and evaluating the plans.

In accordance with the Presidential Regulation Number 16 of 2015, the Directorate General for Control of Watersheds and Protected Forests (PDASHL) functioning under the MoEF has the task of carrying out the formulation and implementation of policies in relation to the management of watersheds and protected forests. Under the direct control of the PDASHL, there are management centres established at the territorial level to carry out functions of the PDASHL. Accordingly, Management Centre for Watersheds and Protected Forests - Solo (BPDASHL Solo) is entrusted to implement watershed management functions of the Solo River watershed using national budgetary provisions.

As reported by Devi (2019), BPDASHL Solo has developed a plan for the management of Solo Watershed, but the scope is too wide because it encompasses the entire Solo Watershed, and the parties has not been involved in its implementation. As a result, the activities are only done partially at different spots, but also without a real impact on improving the condition of Solo Watershed (Devi, 2019).

Accordingly, this protect is aligned with the other projects carried out by the relevant implementation agencies and therefore the project outcomes are complementary to them. As indicated in the project goal, the model developed by the project can be used as an example for the BPDASHL, being the primary implementing agency, as well as for other institutions involved with watershed management activities.

SECTION B – PROJECT EFFECTIVELESS AND EFFICIENCY

3.3 Performance of project implementation

The performance of project implementation was analysed based on the progress of each activity under the respective project output.

3.3.1 Output 1: Preparation of detailed participatory land management plans for the demonstration plots

Activity 1.1: FGD to develop participatory demonstration plot.

Activity brief:

Under this activity, a focus group discussion in each of the three villages (Wonorejo, Wonokeling and Bubakan) have been conducted in June 2021 by the project team. As per the records, a total of 115 community members have attended these meetings (24 in Wonorejo, 43 in Wonokeling and 48 in Bubakan). During the FGDs, three outputs have been achieved:

a) Revision of demonstration plot design prepared during Phase I, including selections of species, planting patterns, spacing etc., and finalizing the detailed design for individual plots.
b) Decisions made on the locations of gully control structures.
c) Discussed and agreed on the potential income generating activities and types of trainings to be given to the community.

Village level officials as well as community leaders have also participated in the FDGs.

Activity progress: Successfully completed.

Evaluator´s Judgment:

This activity was done as a follow up activity of FGDs conducted in phase I. In phase I, the project team has conducted three FGDs in each village focussing on a) awareness creation on SWC, b) introducing the project scope and potential interventions, and c) preparation of demonstration plot designs. Consequently, community members have been selected as Field Partners (FPs) in phase I to establish demonstration plots. Field Partners (FPs) engaged in Phase II were those who were not engaged in field implementation during phase I, due to the limited funding availability.

It was noted that this was a very timely and useful activity. Although the demonstration plot designs were drafted for all participants during Phase I, this FGD has provided added opportunity for the project team as well as Field Partners to learn from mistakes of Phase I and to make more informed decisions with regard to their plot designs and selection of species. Accordingly, Phase II FPs have selected less proportion of Albizia trees (which were attacked by the gall disease in Phase I) and increased the percentage of MPTS in their designs.

Participation of the village level officials and community leaders in this activity was a positive move with regard to sustainability and replicability of actions. However, the notable exception was the non-participation of BPDASHL Solo field level officials who hold the mandate to conduct similar activities at the field level. It was noted that they have not been invited for these FGDs. The project team indicated that it was done purposefully to avoid potential conflicting opinions of the officials of two organization that could have created confusion among community members.

Activity 1.2: FGD among stakeholders to support the implementation of activities.

Activity brief:

Two meetings have been organized by the project team, one in Wonogiri district and the other in Karanganyar district, to create awareness among central level stakeholders on the project activities. Although this activity was originally planned to be held in the first year of the project (November 2020), it has been postponed to the second year due to the prevailing Covid 19 pandemic situation. Consequently, it has been held in June 2021 (Karanganyar district) and November 2021 (Wonogiri district). As per the records, representatives of all related agencies including sectoral institutions in Karanganyar and Wonogiri Districts, BPDASHL Solo, BBWS Bengawan Solo, Jasa Tirta, Solo Watershed Forum, forestry, and agriculture extension agents, CDK Region XI, District Water Services, NGO Persepsi, and head of the villages of Wonorejo, Wonokeling and Bubakan have participated in these meetings making a total of approximately 40 participants in each meeting.

The meetings have been focussed to discuss project interventions as well as to obtain the commitment and potential support that can be provided to complement project activities, based on the mandates of participating institutions.

Activity progress: Successfully completed.

Evaluators' judgement:

Multidisciplinary nature of integrated Watershed management essentially requires integrated approach to achieve success. In that context, this is vital and essential activity to create awareness among the stakeholders and get their support to ensure the smooth implementation and sustainability of project interventions. Moreover, creating prior awareness among all stakeholders is very important to avoid any potential future conflicts.

It would have been ideal, if this activity was conducted during the first year of the project, ahead of the commencement of field implementation activities. However, it was understood that the prevailing pandemic situation has forced it to be postponed to the second year, depriving the opportunity to harness potential contributions of other stakeholders for field activities. Agreement made to integrate NMC management into the workplans of local governments was an important step taken during the FGD. However, it will only be materialized depending on the availability of funding form the government.

Although several agencies have expressed their willingness to support project interventions through supply of various inputs, no notable contribution by any of them was observed. Accordingly, although this activity was listed to achieve the output "preparation of detailed participatory land management plans for the demonstration plots ", it was observed that no real contribution has been received from those stakeholders to achieve the output.

3.3.2 Output 2: Establishment of demonstration plots of conservation farming and watershed rehabilitation

Activity 2.1: Determining the sites of demonstration plots.

Activity brief:

The objective of this activity was to determine the locations of demonstration plots. It has been done in November 2020 with the participation of potential Field Partners (FPs). Selection of FPs for participatory demonstration plots have been done based on their willingness to participate in the

program as well as on the locations of their land plots. Farmers with lands adjacent to each other have been given preferences in selection. Accordingly, a total of 115 plots have been selected for the program (Wonorejo-24, Wonokeling-43, Bubakan-48) with a total extent of approximately 30 ha.

In addition to the participatory demonstration plots, two non-participatory demonstration plots in Wonokeling and Bubakan villages have also been selected with a total approximate extent of 3 ha. The objective of the non-participatory plots was to demonstrate a technical design developed by the project team (taking into consideration the site characteristics) as a control experiment for comparison purposes.

All the selected plots have been measured (boundary, slope, soil depth etc) and mapped depicting physical characteristics with the participation of FPs.

Activity Progress: Successfully completed.

Evaluators' judgement:

The criteria used for the selection of the locations of demonstration plots are justifiable. Most of the demonstration plots were located along the access roads to ensure the demonstration effect to visitors as well as to other community members.

The decision to select control plots (non-participatory) was also a good idea. Although these plots were also privately owned, the respective farmers have expressed their willingness to allow them to be used as non-participatory demonstration plots. It has provided the opportunity for the research team to develop an ideal design that most suits with the site characteristics without the influence of the landowner, who mostly has a tendency to opt for crops that will provide short term income. In addition to using these plots for comparison purposes, upon achieving a successful establishment, they can be used to convince farmers on the importance of making a right choice under the given conditions.

Activity 2.2: Applying vegetative soil conservation measures.

Activity brief:

Under this activity, FPs have been supplied with tree seedlings free of charge (based on the agreed design during the FGDs for each FP) to establish their agroforestry demonstration plots under the technical guidance provided by the project team. FPs have been requested to prepare their land and make planting holes and add manure before they were given seedlings. Approximately 30 ha of agroforestry plots have been established during this phase in all three villages. FPs have planted their seasonal crops within the space between tree seedlings.

In addition, tree planting in non-participatory demonstration plots have been carried out using paid labour, according to a pre-designed model developed by the project team. Although this activity was planned to be completed during the first year, it has been postponed to the second year due to some delay in developing the planting designs through an internal meeting. Different planting designs have been used for upper slope (coffee based) and lower slope (Avocado based). Landowners were allowed to grow short term crops in between tree seedlings.

Activity progress: Successfully completed.

Evaluator's judgement:

Based on the visual observations made during the field visit and information gathered during the discussions with the FPs revealed that the survival of seedlings planted was not optimal. In many plots

durian and nutmeg seedlings have died due to unknown reasons (presumably due to drought). Survival of Avocado, Coffee, and Albizia observed to be good, although the seedlings are still small in size. Absence of a systematic post-planting survival count in any of the demonstration plots (both participatory and non-participatory) is a notable weakness causing difficulties to make judgements about the success of this activity.

Although this activity is named as "applying vegetative soil conservation measures", it is important to note that it is limited to planting tree species in an agroforestry model with somewhat wider spacing allowing FPs to grow seasonal crops. Therefore, the impact of the activity on soil conservation is very much limited until such time the tree canopies spread out to create a significant land cover. Since the tree seedlings are still small (generally less than two feet in height) no significant impact on soil conservation is visible at this stage.

It was observed that there are opportunities available in the area that can be used to strengthen vegetative soil conservation measures. One noticeable example was the presence of Odot grass (*Cenchrus purpureus)* in many landholdings. Community members are widely using it to cut and feed cattle and goat commonly being reared in almost all households. However, the grass is grown in an irregular manner, as in most cases observed to be across the contour. It would have been ideal to systematically plant these grass rows along the contour as an additional vegetative soil conservation measure. It will not only conserve the soil from erosion, but also provides the farmers with an important animal feed that can be harvested regularly within their own landholdings. This particular grass species has very low water and nutrient requirements and when grown systematically, can serve as a wind and fire break as well.

A participatory demonstration plot

Odot grass (Cenchrus purpureus)

Non-participatory plot in Wonokeling - before

Non-participatory plot in Wonokeling - now

The status of non-participatory demonstration plots is also still at an early stage with tree seedlings are still small. It was observed that landowners of those plots also have grown short term crops in between the tree seedlings. They are entitled to receive the benefits of both their short-term crops as well as the MPTS crop established by the project, raising doubts about the term "non-participatory".

Activity 2.3: Applying civil technique soil conservation measures.

Activity brief:

Gully erosion control structures in locations identified in Phase I and agreed upon during FGDs in Phase II have been constructed under this activity. They have been done using hired labour under the direct supervision of the project team. All structures have been built in Wonokeling village.

This activity has been conducted in both the first and second year of project implementation. Accordingly, seven structures consisting of one gabion head structure, four gully plugs using bamboo, one gully plug using cemented-stone and one small check dam using cemented-stone have been constructed during the first year (July 2021). During the second year (between March – May 2022) another sixteen structures have been built consisting of one gabion head structure, thirteen bamboo gully plugs, one cemented-stone small check dam, and one small gabion check dam. All structures have been built according to the serial order, from head to toe, of the gully.

Progress: successfully completed

Evaluators' judgement:

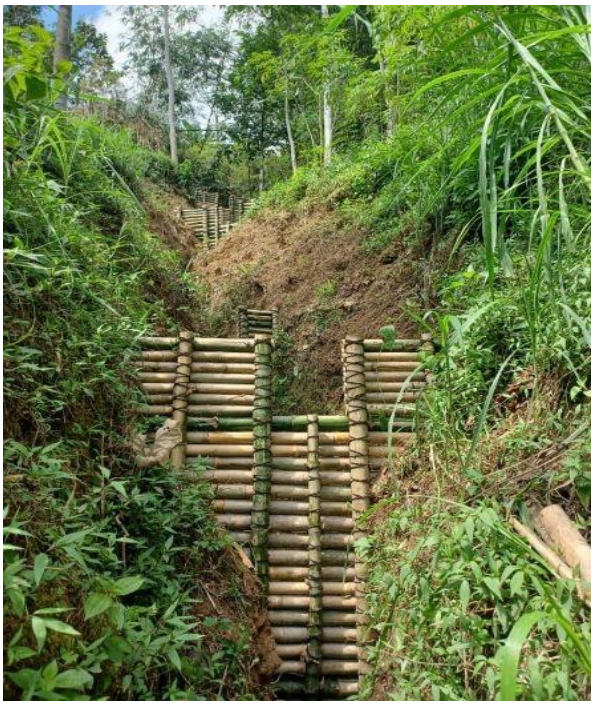
Construction of gully control structures have been done following standard techniques and principles of gully control. They have been built in a serial order to help reducing the water flow velocity. All structures have been constructed to a high-quality standard. Especially the cemented-stone structures look firm and solid with attractive finishing.

Gabion structure - during construction

Gabion structure- now

Cemented-stone structure – during construction

Cemented-stone structure-now.



Bamboo structure – During construction

Bamboo structure - Now

Even within one to two years of establishment, all structures are serving the purpose of gully erosion control. Most structures have retained the eroded sediments and stabilized the gully, preventing any further bank erosion.

Structures made from bamboo can be considered as a novel technology very much suitable to this area. Bamboo is abundant in all three villages and readily available for use. Although some bamboo

structures already started to decay, on most occasions they have started to sprout and exhibit vigorous growth. Once fully grown, they will act as a vegetative barrier across the gully effectively serving the purpose of erosion control. During the discussions it was revealed that some farmers have already established bamboo structures on their own to prevent gully erosion in their landholdings.

One significant and notable absence with regard to this activity is the limitation of civil soil conservation measures only to off-farm gully control structures. Although the activity was named as "applying civil technique soil conservation measures", no on-farm civil techniques (such as bench terracing, contour trenching, contour stone bunds, etc.) have been tried out to control on-farm soil erosion.

3.3.3 Output 3: Enhancement of farmers' skill and income through on-farm and off-farm activities

Activity 3.1: Development of apiculture

Activity brief:

Under this activity, training on bee keeping has been organized in all three villages in November 2021 with the participation of 30 participants from each village. Although it was originally planned to be conducted in the first year of the project, it has been postponed to the second year due to the prevailing pandemic situation. The participants have been selected based on their interest and willingness to get involved in this activity. The group has comprised of both FPs and non-FPs and was also attended by the village officials. Training has covered both theory as well as practical sessions on managing the colonies of the *Trigona laeviceps*, the stingless bee species. It has been conducted with the support of an experienced trainer from an outside regency. After completion of the training program, each village has been given ten colonies each to initiate apiculture at their homesteads.

Activity progress: Successfully completed.

Evaluator´s judgement:

There was clear evidence that the apiculture is a potential income generating activity for the communities in this area. The environment and climatic conditions are very much suitable for this selected bee species (*Trigona spp.*) and there is abundance of forage sources available in the area. A bee farmer who has established his colonies before the project, indicated that the price of bee honey also attractive enough to run it as a profitable business.

However, it was observed that although 90 people have participated in the training, only a handful of participants are continuing with bee keeping. When inquired about as to how the ten colonies were distributed among 30 participants, they indicated that it was decided on consensus and many participants did not want to get colonies as they were not confident enough to manage them. Accordingly, the colonies have been distributed among those who were ready to start, with the consensus of the other participants. It was also revealed that the distributed 10 colonies in the Wonokeling village are being maintained by only two participants with each of them managing five colonies. Any of those colonies are yet to produce sufficient amount of bee honey for extraction.

It was also observed that most participants are still not confident enough to manage this business on their own. They required further training and follow up support to build this into an income generating activity.

Activity 3.2: Training to improve farmer's skill in processing agricultural yields for higher value-added products.

Activity brief:

Two sets of training programs have been carried out under this activity in all three villages.

First set of trainings have been conducted in January 2022 with the participation of 15 participants in each village. The subjects covered were coffee cultivation, post-harvest processing, and coffee serving techniques. It was organized by the project staff while the trainers were brought in from another district. The training has covered germination of coffee seeds, raising seedlings, planting, fertilizing, pest and disease control, harvesting techniques, processing the harvest, and preparing different types of coffee beverages.

The subject areas of the second set of training were avocado cultivation and avocado grafting. It has been held in August 2022 with the participation of 45 participants comprising of 15 participants from each village. Extension agents from Wonogiri district have been invited to conduct this training.

Activity progress: Successfully completed.

Evaluator´s judgement:

The subject areas for this livelihood development activity were well-chosen, as the potential to develop these activities in all three villages are very high. Most of the villagers already grow coffee and avocado in their landholdings and the survival rate and growth potential of both species were observed to be very high. Since project also has promoted these two species in the demonstration plots, this can be considered as well-selected linked activity.

It was specifically observed that a few young people have already made use of the training. The evaluation mission met three young individuals, two in Wonorejo and the other in Bubakan village who have been instrumental in forming two youth groups in their respective villages and already started coffee processing and packaging business. Their products are of very high quality, and both groups sell their products through online marketing. With the support of a university team in a nearby city, they have developed high quality promotional material for marketing. It was also revealed that they have found enough demand for their products and very much looking forward to expanding their businesses.

Coffee processing young entrepreneurs in Wonorejo

Coffee processed by an entrepreneur in Bubakan

The evaluation mission also encountered another young group led by a young entrepreneur who has established a nursery to develop grafted avocado seedlings using the knowledge gained through the training provided by the project. It was noted that they are getting sufficient orders to continue with their business. They are also keen to expand it to a fully-fledged nursery and already diversifying their seedling production by trying out other valuable species as well.

Activity 3.3: Training to improve farmer's skill in processing household and agriculture waste.

Activity brief:

Under this activity, one-day training programs on management of household and agricultural waste have been organized in each village. It has been designed as two sessions to cover household waste and agricultural waste in separate sessions with different participants selected for different sessions. 15 participants each have participated in each session. The project team has organized this training in collaboration with a waste management group of an outside village. Objective of the activity was to create awareness among participants on the increasing accumulation of different types of waste in the NMC and encourage them to manage them properly. In addition, it was expected to encourage participants to develop additional off farm income sources from the waste material.

Activity progress: Successfully completed.

Evaluator's Judgement:

It was evident that this is also a much-needed activity in the NMC villages. Firstly, it provides benefits to the participants in making use of degradable waste resources as organic inputs to their cultivations. Secondly, it creates awareness and behavioural change among the villagers to manage their waste in a systematic manner. Since both Wonorejo and Bubakan villages have already started promoting nature-based tourism in their respective villages, keeping the natural environment clean and tidy is very much important to attract nature lovers to the respective tourist attractions.

However, it is difficult to estimate the extent to which this activity has an impact on creating a behavioural change among the villagers, as haphazard disposal of non-degradable waste to the environment is still visible especially in some waterways and gullies. Absence of a systematic collection of non-degradable waste in these remote villages deprive community members in gaining economic incentives from their recyclable wastes. It is understandable that the recyclable waste collectors are not interested to visit these villages due to the remoteness and far distance from waste recycling facilities. In addition, limited volumes of waste being generated in these villages are not cost effective to run a business model for an investor.

3.3.4 Output 4: Preparation and dissemination of information on the impacts of the demonstration plots of conservation farming and watershed rehabilitation

Activity 4.1: Water yield and sedimentation monitoring

Activity brief:

The objective of this activity was to maintain regular monitoring of water yield and sedimentation in four outlets of the main river as well as its tributaries namely Angut, Branjan and Muncar. Baseline data had been collected by the project team before the establishment of demonstration plots and civil structures. Data collected were rainfall, flow discharge, total runoff, and sediment yield. During the project period, continuous data collection has been carried out. The equipment used were, a rain

gauge installed in NMC, water level recorders and sediment collectors installed in three outlets namely Branjan, Muncar, and Naruan.

However, it was noted that no data collection (except rainfall) has been carried out after the completion of the project.

Activity Progress: successfully conducted during the project period. But not continued after the completion of the project.

Evaluator´s judgement:

The monthly data distribution during the project period has not shown any relationship between the activities of the project with the hydrological condition in the NMC. It can be understood by the magnitude and nature of project interventions on those parameters. Of the total NMC area calculated to be about 957 ha, only about 90ha of demonstration plots have been established during both phases of the project. Moreover, the vegetative conservation measures were limited to planting tree seedlings (which are still at the early growth stages) while the mechanical soil conservation measures were limited to the construction of gully control structures in few selected locations. These interventions are inadequate to create any significant impact on the parameters measured under this activity.

However, discontinuation of the data collection is a significant drawback in post-project monitoring. Although the project team expressed their commitment to continue the data collection and monitoring, they are faced with the uncertainty of using government funding for data collection after the major restructuring process taken place in the recent past. They are yet to digest this major change and waiting for the guidance and directives on administrative and financial matters. The supervisory agency they were working under during the project period (FORDIA) is no longer under the MoEF now.

Activity 4.2: Land evaluation

Activity brief:

Under this activity, baseline data related to land aspects such as slope, soil type, and land cover, have been collected to predict soil erosion. After the demonstration plots were established, plant performance has also been monitored one month after planting, starting from January 2021, by measuring plant height and diameter growth in selected permanent sample plots. Each village was represented by three permanent sample plots.

However, similar to activity 4.1, data collections have been discontinued after the project completion.

Activity progress: Successfully conducted during the project period. Discontinued after the completion of the project.

Evaluator´s Judgement:

This is also a much-needed activity which should be continued especially during the post-project period.

Visual observations made during the evaluation mission revealed that there is a considerable amount of soil erosion taking place in most of the landholdings which are cultivated with seasonal crops. Although it is still very early to expect any significant impact of project interventions on soil erosion in demonstration plots, long term monitoring is very much important to assess the potential longer-term impact.

Crop performance in demonstration plots have been measured (during the project period) in selected sample plots only. Therefore, no systematic data available to evaluate the growth performance and survival of seedlings planted. It will have an adverse impact on timely replacement of dead, dying, and diseased seedlings. Moreover, discontinuation of post project monitoring makes it further difficult to assess the success of the demonstration plots.

Activity 4.3: Evaluation of economic and community behaviour on land management

Activity brief:

Monitoring and evaluation of economic and social aspects were planned to be carried out under this activity to provide information on the socio-economic impact of the conservation farming and watershed rehabilitation of demonstration plots. Data have been collected through interviews with field participants (FPs). The types of data collected were average age, main and secondary livelihoods, education level, other income sources, average livestock in possession, source of animal forage, cropping patterns, and level of participation in farmer organizations.

Activity progress: Data collection have been done during the project period. However, no data were collected after the project completion.

Evaluator's Judgement:

Systematic collection of socio-economic data is vital for the assessment of project impacts on the livelihoods of community participants. In order to analyse them quantitatively, a well-designed consistent approach should be followed using a representative sample of reasonable size. Such approach has not been followed in this project.

On the other hand, it is very much pre-mature to expect any significant increase in the participants income within a short period of time. Most of the interventions require a reasonable gestation period to generate benefits. Therefore, continuation of periodic data collection after the project period in a systematic manner is very much important. However, some qualitative data such as community awareness, behavioural changes, perceptions on SWC etc., are still difficult to measure and depends on the personal judgements of the data collector.

3.3.5 Output 5: Make recommendations and prepare a policy brief of the best agroforestry model.

Activity 5.1: Internal meeting to discuss and formulate the best agroforestry model.

Activity brief:

The original objective of this meeting was to analyse results of project activities and M&E data within the executing agency (WMTC) and evaluate the impacts of different agroforestry models to decide on the best agroforestry model to be recommended through a policy brief.

Accordingly, the meeting has been held twice, first on 30th August 2021 and the second on 8th August 2022. The participants of the meeting were the project team, project consultants, head of Planning and Evaluation Division of WMTC, head of Data Information and Cooperation Division of WMTC, and the researchers of WMTC.

The meeting has concluded that the project experience can be used to develop a policy brief. Accordingly, the policy brief has been drafted by the members of the project team.

Activity progress: Meetings have been held as planned and policy brief was drafted.

Evaluator's Judgement:

This is also a much-needed activity to share the experience of project activities within the different divisions of the executing agency and to use those results to brainstorm the way forward.

Although it was originally planned to decide on a "best agroforestry model", no such decisions have been made. Instead, it has been decided to use the broader village-based participatory process as a model to be recommended to the concerned stakeholder agencies to implement in their watershed management projects and programs.

Policy brief has been well drafted covering important aspects such as overarching issues and challenges of integrated watershed management, existing conditions, methods adopted by the project and important findings, and finally with the policy options and recommendations.

One notable shortcoming of the policy brief is the absence of any concrete recommendation to address the issue of institutional disintegration in the watershed management programs, though it has been recognized in the policy brief itself as a major challenge.

Another important drawback revealed during the evaluation was the non-submission of the policy brief to the concerned authorities up until now. Project team is waiting for some guidance to decide on an appropriated channel to submit it through the hierarchy of organizations. It was originally planned to submit to DG/PDASH through FORDIA. However, since the FORDIA is no longer with the MoEF, project team is yet to find an appropriate channel. Accordingly, none of the recommendations included in the policy brief has materialized so far.

Activity 5.2: Workshop to share and discuss the project results.

Activity brief:

Under this activity, a stakeholder workshop has been organized by the project team on 31st August 2022, at the WMTC office under the theme "The role of the parties in supporting the sustainable management of NMC". The objective of the workshop was to share the project experiences, lessons learnt and to obtain the feedback and commitment from stakeholders to ensure the sustainability of the program. It has been attended by approximately 50 participants consisting of representatives from project steering committee, BPDASHL, Bapperlitbang, project consultants, local sectoral institutions, extension agents, NGOs, and district and village government officials.

At the end of the workshop, a commitment agreement has been signed by the parties for collaborative management of the upstream Solo River watershed.

Activity progress: Successfully completed.

Evaluators' judgement:

This project being action research and a demonstration project, this particular workshop also can be considered as a very important activity. As per the records, all relevant agencies and stakeholders have participated in the workshop and have provided their comments and inputs. Furthermore, all parties agreeing to sign a commitment agreement is also a very positive step, ensuring their commitment and support for the project activities.

3.4 Project achievements

Project achievements were analysed against the desired project outputs, project objective, as well as the project goal. Accordingly, project accomplishments are summarized below.

3.4.1 Project achievements against the desired outputs

3.4.1.1 Output 1: Preparation of detailed participatory land management plans for the demonstration plots.

Project has achieved this output as it was planned in the design document. Community engagement have been obtained for every step of the planning process. Available opportunity to incorporate lessons learnt in Phase I has been utilized to avoid similar failures/shortcomings during the second phase. Agreement reached with the FPs to incorporate a high proportion of multi-purpose tree species against timber species will inevitably help to maintain tree cover for a longer period, thus ensuring long term soil conservation.

Notable shortcoming of the participatory land management plan design was the absence of any on-farm vegetative and/or mechanical soil conservation measures. Although it has not been planned at the design stage of the project, at least some low-cost potential measures (such as grass strips) could have been incorporated to the design.

Although no direct contribution has received from other stakeholder agencies to achieve this output, the FGD conducted among stakeholder agencies at the central level will have a positive effect on the entire process of project implementation and sustainability. However, their absence (especially the BPDASHL Solo) at the site level activities can be considered as an opportunity lost for mutual benefit when it comes to replication and upscaling. However, project team had their own reasons to not to get them involved at the site level, which cannot be denied under the given circumstances.

3.4.1.2 Output 2: Establishment of demonstration plots of conservation farming and watershed rehabilitation.

Project has achieved this output as desired. Accordingly, approximately 30 ha of demonstration plots have been established in three villages successfully. Apart from some occasional casualties with certain species planted, all demonstration plots visited during the evaluation mission are being maintained satisfactorily.

Although the demonstration plots will contribute to watershed rehabilitation in the long run, it is somewhat questionable whether they are qualified to be called "conservation farming" demonstrations. Apart from incorporating tree seedlings under an agroforestry design, hardly any other conservation farming techniques have been implemented. Majority of FPs continue to grow seasonal agricultural crops in between rows of tree seedlings, without any other vegetative or mechanical soil and water conservation measures.

Almost all demonstration plots have been established near the access roads, so that it can be viewed from the roadsides creating demonstration effect for community members as well as for visitors who come to witness the project interventions. However, one important shortcoming noticed was the absence of any sign boards/identification marks, placed in demonstration plots to enable a visitor to recognize them easily from the other landholdings.

Although this particular output has no mentioned the off-farm soil conservation measures, this project has established some well-designed, solidly constructed, gully control structures in selected locations. Although that activity was listed under the same output, it is not reflected in the wordings

of the output, indicating a weakness in framing outputs and actions in a logical manner at the planning stage.

3.4.1.3 Output 3: Enhancement of farmers' skill and income through on-farm and off-farm activities.

The project has achieved this output to a limited extent. It is well understood that enhancing farmer´s skills and income is hardly possible to be achieved through few selected one-day training programs. It requires a systematic and continuous effort through a well-designed livelihood development approach, taking into account existing livelihood strategies, realistic options available, farmer´s willingness to change, social and environmental contexts, access to capital, as well as availability and linkages to market, etc.

It was observed that some training programs provided by the project have significant impact on a few enthusiastic individuals. Most promising case noted was the initiation of the coffee processing and marketing business by two young groups. They have formed into informal youth groups to engage on this business using new technology for promotion and marketing. Similar youth group was also observed starting a tree seedling nursery primarily producing grafted avocado.

Although there appears to be a high potential to promote bee keeping as an additional income source, it is yet to be attracted by adequate amount of community members. Even though project has provided training for 90 members of the community, only a handful of them have initiated the practice. It was observed that the farmers still lack confidence to engage in this activity highlighting the need of a continuous follow up and support service to enhance their skills and confidence levels.

As mentioned in the previous chapter, it is difficult to assess the level of achievement of the waste management training. During the interviews, community members indicated that they utilize agricultural and perishable household waste as farm inputs. However, due to the absence of a collection and disposal mechanism, non-degradable waste still remains a problem in all three villages.

3.4.1.4 Output 4: Preparation and dissemination of information on the impacts of the demonstration plots of conservation farming and watershed rehabilitation.

Collection of data to generate information on biophysical and social impacts have been carried out during the project period. However, it was noted that the data collection process was not systematic, as it was not built on a sound M&E framework and monitoring plan developed at the planning stage. Moreover, after the completion of the project, coinciding with the government restructuring process, data collection has been completely discontinued depriving the valuable information that could have been collected to measure the success and sustainability of the project interventions.

Accordingly, the achievement of this particular output was only partial. It can be identified as a weakness at the planning stage, in which outputs must be drafted in such a way that they can be achieved during the project period. Moreover, actions to be clearly and logically identified to ensure the full delivery of the desired outputs.

Though it was not specifically identified as an activity under this output, this project has developed several information materials of high-quality standards. However, they were mostly focussed on the methodology and process followed, rather than the impacts of demonstration plots (as specified in the output).

It is also important to understand that more time is needed to produce any measurable impacts from the limited number of interventions implemented by the project activities.

3.4.1.5 Output 5: Make recommendations and prepare a policy brief on the best agroforestry model.

A well drafted policy brief has been prepared by the project team utilizing the lessons learnt and experience gained during the implementation of this action research project. It has addressed the overarching issues of watershed management in Indonesia, existing conditions, laws and regulations, and findings of the project, etc. It also provides policy options and recommendations to be followed.

Although this output specifies that the policy brief will provide "best agroforestry model", no such model has been identified. Instead, the focus given in the policy brief was the participatory process followed in the project as a model for watershed management.

A notable shortcoming of the policy brief is the absence of any recommendation to address the issue of disintegration. Although the introductory part has clearly identified it as a major issue (which is common for many economies), no recommendation is given to overcome that in Indonesian context.

Although the policy brief was already drafted, it is yet to be submitted to the relevant policy makers for consideration and implementation. Project team appears uncertain about the appropriate channel through which they could submit this document for implementation.

Therefore, nearly one year after the project completion, this output is yet to be fully accomplished.

3.4.2 Project achievements against the objectives of the project.

As specified in the project proposal, objective of this project was to "implement micro catchment management by improving the available plan and extending the impact area, based on community participation and stakeholder collaboration, considering the soil and water conservation principles."

This project was an extended version of the Phase I participatory micro-catchment management project. The detailed micro-catchment management planning has been done during Phase I, and this project has improved the available plan taking into account the lessons learnt and experiences gained during the implementation of Phase I. It has also extended the impact area by extending the demonstration plots by 30 ha and constructing 23 new gully control structures. Community participation has been obtained at all levels of the planning and implementation process. Although the stakeholder collaboration appears to be limited, project has taken significant efforts to make the stakeholders aware of the project interventions. Soil and water conservation measures were undertaken to certain extent, while there is a room to incorporate some additional vegetative and mechanical measures.

Within the given context, it can be concluded that the project has achieved its desired objective.

3.4.3 Project achievements against the goal.

As stated in the project proposal, the goal of the project was "to build a model of successful watershed management at the operational level (micro catchment). This model may be used as an example of successful watershed management to be applied in other micro catchments."

The project has designed a participatory approach to address watershed management issues within a nationally identified priority upper watershed area and successfully implemented it at the

operational level. It has documented the process followed and produced several important materials for reference. The model developed by the project is therefore available as an example for replication and upscaling in other micro catchments.

Under the given context, the project has significantly contributed to the realization of the identified goal.

3.5 Performance of project management

The performance of project management was assessed by several criteria, including project communication and dissemination; monitoring, evaluation, and reporting; project consultancy; and project management and implementation teams.

3.5.1 Project communication and dissemination

The project has followed a well-designed communication strategy developed at the planning stage. It has clearly identified the different elements of communication along with their objectives, target audiences, key messages to be delivered, as well as the appropriate communication tools and dissemination channels. In addition, a monitoring plan has also developed to ensure the timely implementation of the communication strategy.

Accordingly, project has produced a variety of communication and outreach material targeting number of different audiences, including policy makers, practitioners, students, as well as the general public. They included leaflets, posters, compact discs, and several materials uploaded to the websites and disseminated through social media. All materials have included APFNet logo in an appropriate manner to highlight the visibility of APFNet as well.

In addition, project experiences have been utilized to produce several important scientific papers. Some of which have been presented in important forums and also published in different publications including international journals.

3.5.2 Project management and implementation teams

As described in the project proposal, the institutional structure of project management consists of a project steering committee, supervisory agency, project team, project consultants, and an external auditor. It was a well-structured institutional arrangement consisting of all important elements.

The three-member project steering committee chaired by the Director General of Extension and Human Resources Development Agency of the MoEF has met at regular intervals and has provided policy guidance and directives to ensure the smooth implementation of the project. Extension and Human Resources Development Agency (BP2SDM) of the MoEF functioning as the supervisory agency has made a visit to project sites and has provided feedback and inputs for project management. WMTC being the main executing agency has formulated a multi-disciplinary project team led by the project Director/Coordinator and comprising of some experienced scientists and sector experts. The team understand each other by working together for some considerable period of time in the same organization and capable of providing a great team effort for the project management.

The project has clearly identified the two major subject areas in which the project team was in need of additional consultancy inputs. The project team expressed their satisfaction about the consultancy inputs provided by the two consultants.

The project has been audited by an external auditor at the end of each year and has submitted a comprehensive audit report certifying that the project expenditure is in accordance with the financial and administrative guidelines of the government of Indonesia.

3.5.3 Monitoring, evaluation, and reporting

One of the major shortcomings of this project is the absence of a monitoring and evaluation framework developed at the planning stage. No such framework is attached to the project proposal or annual work plans.

Project has used a Logical Framework (Log Frame) as a planning tool. Although indicators have been identified in the Log Frame, due to the absence of a M&E framework, data sources, data collection methods, roles, and responsibilities, as well as timelines, were not specified in the project design.

3.5.3.1 Internal Monitoring and Evaluation

Internal monitoring has been undertaken by the executing agency's project team through their day-to-day management of the project. They have ensured the timely implementation of project activities to achieve their desired objectives.

EA was up to date in submitting progress reports to the APFNet. All reports were well compiled in a comprehensive manner. In addition to the annual progress reports and a project completion report, project team has submitted a comprehensive technical report with important technical content to complement to the project completion report.

Internal evaluation has been performed by the supervisory agency (BD2SDM) and FORDIA through a field visit made in August 2021 to examine project implementation performance on ground. Although it has been originally planned to have two evaluation missions during the project period, first year mission has been cancelled due to covid 19 pandemic situation at that time. The evaluation has covered the budget usage as well, in accordance with the financial and administrative regulations of the Indonesian government.

Upon completion of their evaluation, both agencies have provided their comments and feedback to the EA highlighting the importance of disseminating the information among soil and water conservation implementing agencies such as CDK and BPDASHL for replication and scaling up in the other areas. Additionally, BP2SDM has recommended to design an "exit strategy" during the project period to ensure the sustainability of project interventions. However, it was noted that no such strategy was designed or implemented prior to the completion of the project.

In addition to the above two agencies, Ms Novia Widyaningtyas, a Board Director of APFNet, functioning as an expert staff of the Minister of Environment and Forestry for Industry and International Trade of the government of Indonesia has also made a visit to the project sites in 2022. She also has commended the project achievements and highlighted the importance in replicating the participatory approach and cropping pattern in other watersheds.

3.5.3.2 External Monitoring and Evaluation

APFNet PMD has served as the external monitoring body to oversee the project's day-to-day management and the status of the project throughout its implementation against the approved work plans and budget.

Due to the prevailing Covid 19 pandemic and associated travel restrictions, APFNet has not able to organize mid-term or terminal evaluation of this (Phase II) project.

3.5.4 Project consultancy

The project has employed two national consultants throughout the project period. One of them is an expert in soil and water conservation while the other is an expert on social science, economics, and agribusiness. Both possess sound educational and practical experience on their respective subjects.

Both consultants have been issued with a term of references (TORs), and a copy of which was attached to each AWP. However, the duties and responsibilities of the given TORs were too broad without clearly described outputs. Nevertheless, both consultants have participated in almost all project related events and meetings and have provided their inputs to the project team. The project team expressed their satisfaction regarding the support and contribution received from the consultants.

Accordingly, it can be concluded that the selection of the areas of expertise and management of consultants under this project are at satisfactory level without a heavy financial burden incurring to the project budget.

3.5.6 Project timelines

Despite the challenges posed by the Covid 19 pandemic, this project has implemented the targeted activities very much in line with the timelines stipulated in the project proposal and AWPs. Although there have been some slight changes of the timing of implementing few activities against the original plan, those changes had no significant adverse impacts on the delivery of project outputs.

SECTION C – PROJECT IMPACTS AND SUSTAINABILITY

3.6 Project impacts

The project has enhanced the public awareness among the villagers in the targeted micro catchment on the importance of soil and water conservation. People who responded to this evaluation clearly expressed that they are aware of the prevailing soil erosion and believe that conservation measures are required to sustain their agricultural practices and livelihoods. This enhanced understanding will have a significant positive impact on any watershed management project or program to be implemented in the region in future.

The project has made several efforts to increase the awareness of stakeholder agencies about the need of an integrated approach to deal with watershed management issues. Some agencies have committed to contribute in different ways to complement interventions made by the project. However, it is difficult to judge the level of impact generated by the project to create a transformative change among those diverse stakeholders, who are generally driven by their own mandates.

From the environmental perspective, there will be changes in land cover from pure seasonal crop farming patters on sloping lands to multipurpose tree dominated agroforestry patterns in the selected demonstration plots. However, their impacts on soil and water conservation will be visible only after the trees grow to a certain height with significant crown density to cover the exposed soil surfaces. It was learnt that few non-participants also have initiated planting trees in their respective landholdings, showing that the impact of demonstration effect is already taking place.

The positive impacts of gully control measures implemented by the project are already visible with all the gullies treated by the project have stabilized without any further expansion. This will have some positive impact on the management of the micro watershed. However, the overall impact will be still very small as there are many large gullies in the entire NMC that requires similar treatment. Although some villagers have constructed few bamboo-based gully control structures in their landholdings, it is not realistic to expect that they will establish more permanent structures in large gullies without any outside support.

From the hydrological perspective, this project is yet to create any significant impact on the hydrological parameters, because the area managed by the project is still too small compared to the total area of the micro watershed. Moreover, even within the selected demonstration plots, the project interventions were limited to planting trees without any other vegetative or mechanical soil and water conservation measures.

A section of NMC – Before the project

Same section of NMC - Now

From the economic perspective, the project interventions are yet to create any significant impact on the household income and livelihoods of community members. It will take few more years for the multipurpose tree species to produce yields to supplement their income. Among the livelihood support programs introduced by the project, apiculture has a significant potential but yet to be established as a viable business entity among the community members. It has a potential to be enhanced, provided that continuous follow up actions and technical support is given. Enthusiasm and attraction of young entrepreneurs towards coffee processing and avocado grafting are encouraging signs likely to generate better prospects to the community in years to come.

The results and experiences of this project have been well documented and disseminated through different media including, leaflets, posters, as well as scientific publications. They will be very much useful for the watershed management practitioners, scientists as well as general public.

Even though the development of a policy brief was earmarked as a major output of this project to create a policy, legal and institutional change in the government approach for watershed management, it is yet to create any impact under the present circumstances.

3.7 Issues, challenges and lessons learnt.

Most of the issues, challenges and lessons learnt during the implementation of this project have been documented by the project team in the project completion report and final technical report. While duly acknowledging all of them, this section is intended to summarize salient issues, challenges and lessons that are identified as most crucial.

- Watershed management is a complex issue often requiring concerted efforts of multi-disciplinary stakeholders in an integrated manner. Although this project has made valuable efforts to create the stakeholder integration at some strategic points of project implementation, it has not fully accomplished the desired success. Participation of other stakeholders at the site level was low, with no tangible contribution to the project interventions. It is a common issue in many economies that government agencies with different mandates tend to work in isolation without much commitment for an integrated effort. A strong policy guidance is required to bring about the true integrated approach.
- According to the project team, one of the major challenges encountered in designing and establishing participatory demonstration plots were the reluctance of landholdings to change from pure seasonal crops to agroforestry patters. It can be rationalized by the low-income levels of FPs favouring immediate farm income to support their livelihoods rather than investing on longer-term tree crops. Introducing off-farm alternative income generating opportunities can create that change only if they are designed to generate short term income sufficient enough to compensate the income from cash crops.
- Selection of tree species is crucial when agroforestry models are implemented as soil and water conservation measures in sloping terrain. Short-term fast-growing timber species (Albizia) widely used in the first phase of this project are already clear felled by now, resulting increased soil erosion. In order to maintain a longer-term tree cover to protect soil and conserve water, incorporating multi-purpose tree species to the extent possible is expected to be the better option. In that regard, this project has used non-participatory demonstration plots to convince farmers for making informed decisions on selection of suitable MPTSs and cropping patterns.
- The biggest challenge in constructing gully control measures is the high cost associated with many mechanical structures. Moreover, the cost is proportionate to the size of the gully,

needing more permanent and high-cost investments to stabilize large gullies. In addition, it is mostly a common situation that most of the gullies are formed in between two landholdings making it extremely difficult to convince the two owners either side of the gully to invest in control structures.

- One of the prospective technologies tried out successfully in this project with regard to gully control is the introduction of bamboo-based structures. They are low cost (provided that the bamboo trees are abundant in the nearby locality) and proven to be successful in almost all the locations tried out in the project. Even though the bamboo stump will start to decay in about few months' times, it was observed in the project site that the new clumps started to sprout making a permanent bamboo bush across the gully. However, the major limitation of bamboo structures is that they cannot be used to stabilize large gullies due to their inherent structural weaknesses.
- Livelihood enhancement programs generally require systematic approach with proper understanding of community aspirations and often demands continuous engagement with the targeted community to ascertain tangible success. The one-day training programs implemented by this project appears to be insufficient to create a significant change in the livelihoods of targeted communities, although the interventions identified are prospective for the area.
- Young and innovative entrepreneurs are big assets in remote villages who should be supported to create new business opportunities for common benefit. In that context, coffee processing youth groups formed as a result of the training program are likely to create an increased market demand for coffee, eventually encouraging community members to plant more coffee in their landholdings. Eventually, it will contribute to watershed management by converting farmers from growing seasonal crops into perennial tree crops and thus reducing soil erosion and sedimentation in the rivers. Additionally, the availability of viable business opportunities in the villages will also reduce the problem of increasing urban migration.
- Waste management is a complex issue, which often yields success when economic incentives are embedded in the programs. Although some success has been achieved in the project area in the management of agricultural and perishable household waste to be used as farm inputs, segregation and collection of non-degradable waste will only work when there is a collection mechanism available linking the households with recycling facilities.
- Government´s institutional restructuring programs sometimes create significant challenges on the sustainability of projects and programs implemented by the agencies. The significant change of the mandate and hierarchical structure of the executive agency of this project has created uncertainties among the officials resulting in temporarily discontinuation of planned follow up actions of the project.

3.8 Project Sustainability and duplicability

The sustainability and duplicability of project interventions were assessed based on the observations made during the evaluation mission and discussions carried out with different informants including project staff, government officials, field participants and community members. It is important to note that for some activities it is difficult to make definitive judgements as they are very much dependent on changing circumstances.

Accordingly, observations made on the sustainability and duplicability of project interventions are summarized below.

3.8.1 Demonstration plots

Most of the demonstration plots are likely to be sustained without any additional outside support. Field Partners who responded to the interviews appears to be convinced and satisfied with their land allotments and believe that they will receive economic benefits by the time trees start to produce intended yields. Although some species planted have been subjected to high casualty rates, FPs are willing to replace them with other species proven to be successful. Some of them have already done that with their own expenses.

There is evidence of some of the non-participants motivated by the project interventions have incorporated MPTS in their landholdings, showcasing the demonstration impact within the project area. It can be assumed that more people will follow the same when the trees in the demonstration plots start to yield products.

The duplicability of demonstrations plots in other areas will be very much dependent on the positive actions taken by the respective government agencies, especially BPDASHL and CDK. So far there is no conclusive evidence on them making any effort to duplicate the model elsewhere. The situation might change if some concrete policy guidance is issued from the higher level. In that context, it would be very important that the policy brief is submitted to the relevant authorities and the recommendations are implemented in a constructive manner.

3.8.2 Gully control structures

Among the different activities implemented by this project, gully control structures are most likely to be sustained for a longer period of time. The gabion and cemented-stone structures have been built to a high-quality standard and look solid to be sustained without any further maintenance. Although the bamboo structures are starting to exhibit signs of decay, some of them have produced sprouts and most likely to be established as a permanent vegetative barrier across the gully.

It is encouraging to note that some community members have replicated small bamboo-based gully control structures in their landholdings. However, it is unlikely to expect community members to volunteer to construct gabion or cemented stone structures, unless some incentive package is introduced by the government or a funding agency.

3.8.3 Apiculture

The practice of bee keeping introduced by the project is yet to be established in the three villages. Although there appears to be a significant potential available in the area to make it to a lucrative business opportunity, the participants involved with the training program are yet to gain confidence to continue with it and expand it to a commercial level. They are in need of follow up technical support to enhance their confidence level to engage with it.

One positive sign observed is the presence of one farmer in Wonokeling village already engaged in apiculture to a small commercial level. However, in order to sustain this activity and to duplicate it in other areas, long-term follow-up actions by the experienced support services are necessary.

3.8.4 Coffee growing and processing.

The site characteristics of NMC are very much suitable for coffee growing. Even before the project conducted this training, some of the villagers have already grown coffee in their landholdings. There is a ready market demand for coffee in Indonesia, and therefore, this would be very much suitable for

the hillside lands in NMC. Furthermore, coffee could be promoted as a commercial crop to replace seasonal crops.

Interest and enthusiasm of the youth groups to start coffee processing industry in the villages are a very encouraging result brought about by the project. They are already using modern technology for their packaging and making use of the online marketing channels to market their products. If these young entrepreneurs could expand their business on their own or with some outside support, they will create an increased demand for coffee in the area, influencing community members to expand coffee cultivations in their landholdings.

3.8.5 Avocado grafting

Similar to coffee, avocado is also a potential crop that can grow successfully in the NMC area. People are already aware of the potential of that crop and have started to grow avocado in their homegardens and landholdings. In that context, training them for grafting avocado was a well-chosen intervention by the project to ensure the propagation of high-quality seedlings.

However, it was noted that the training organized by the project has had limited impact to encourage the participants to start nurseries. Apart from one youth group in Wonokeling village who have started to develop a nursery at small scale, no other participant has made use of that training to produce grafted seedlings. Accordingly, the sustainability and replicability of this intervention is still uncertain.

3.8.6 Waste management

Providing training and awareness on sound management of agricultural and household waste is a much-needed activity in the project area which is located in the uppermost parts of the nationally important watershed. The area is already being promoted as a nature-based tourism destination. Accordingly, keeping the environment free from waste is very much important in many ways.

However, the impact generated by the training program is less likely to be sustained due to the absence of any systematic waste collection mechanism in the area. The evaluation mission also witnessed the irrational disposal of both agricultural and non-degradable waste in public areas, gullies, and waterways.

3.8.7 Monitoring and evaluation of project impacts

Project has identified number of biophysical, social, and economic parameters to be monitored to assess the long-term impacts of the project interventions. Baseline data collection has been done before the implementation of project interventions. Furthermore, data collection on identified parameters have been implemented during the project period. However, due to the absence of a M&E framework in the project design, data collection was not systematic enough to support quantitative analysis.

After the termination of the project, coincided with the government reorganization program of relevant institutions, data collection has completely discontinued. Project team also faced with inadequate budgetary provisions to continue the data collection, as the sites are somewhat far away from their office incurring substantial cost for travelling.

Accordingly, this activity is less likely to be sustained, unless a firm policy directive is given from the MoEF, accompanied with continuous supply of required financial provisions for data collection.

4. CONCLUSIONS

All project activities have been completed successfully in accordance with the project design and annual work plans, within the planned period with maximum utilization of available budgetary provisions. However, EA has failed to continue the post-project monitoring and evaluation as originally planned, due to the reasons beyond their control.

Among the five desired outputs identified in the project design, project has achieved two outputs completely. The achievement of the other three outputs is only partial. In this context, it is important to note that there is a weakness in project design with regard to aligning actions against outputs in a logical manner.

With regard to the project goal and objective, it can be concluded that the project has fully achieved its "desired objective" and significantly contributed to realize its "set goal", despite the fact that there are shortcomings in aligning them with actions and outputs logically in the project design.

Different criteria were used in the evaluation to assess the performance of project implementation. Accordingly, it can be concluded that the overall performance of project implementation is satisfactory. The project has developed a number of useful communication material of high quality for dissemination which can be used to replicate and upscale the model developed by the project. It has been operating under a well-structured institutional arrangement and implemented by an experienced multi-disciplinary team of professionals, complemented by carefully selected consultants of relevant disciplines. However, partially due to the absence of a monitoring and evaluation framework at the project design, post-project monitoring and evaluation to measure the log-term project impacts has become a challenge.

The project has created a significant positive impact on the awareness and understanding of the importance of soil and water conservation among the targeted communities. Although it has made several efforts to create much needed integration among stakeholders to address the watershed management issues in a holistic manner, the extent to which it has achieved the success is yet to be seen. Taking into account the vast magnitude of environmental problems associated with the entire micro-catchment, the interventions of the project are still observed to be small and yet to create any significant impact on the biophysical and hydrological parameters. Similarly, it requires reasonable period of time, supplemented by continuous follow-up actions, to generate anticipated positive impacts from project interventions on the livelihoods and socio-economic status of targeted communities.

5. RECOMMENDATIONS

5.1 Recommendations for executing agency.

Following recommendations are intended for the executing agency (ex-WMTC, and currently BPSILHK Solo)

- It would be mutually beneficial for the EA to maintain close relationship with the communities in NMC. Evaluation mission observed that the community members have developed a significant trust on the project team and also the technical guidance given by them. It is a significant positive asset that can be productively used to ensure the sustainability and replicability of project interventions, even without any funding support.

- It is important that the EA seeks the opportunities to obtain some financial provisions from the government to continue the field monitoring activities as early as possible, without letting valuable information of the project impacts being lost.
- EA may explore the possibilities of linking the communities with organizations (both government and non-government) who are currently working with livelihood enhancement programs such as apiculture, coffee processing, etc. to provide some follow-up support to the NMC community.
- One of the most important actions to be followed up is the submission of policy brief to the relevant authorities through an appropriate channel and follow up its implementation without further delay. The project team may also brainstorm to incorporate appropriate policy recommendations to create the inter-agency coordination in integrated watershed management.
- The project has triggered some interesting cases in the NMC (such as coffee processing youth groups) that can be further studied and documented. Such case studies can be presented in different forums and disseminated nationally as well as internationally.

5.2 Recommendations for APFNet

This evaluation revealed that there exist some weaknesses in project designs especially with regard to framing activities that are capable of delivering tangible outputs and outcomes during the project period with available funding resources. It is recommended to address this capacity issue among project proponents by providing them with additional support preferably during the project identification stage.

Annexes:

Annex 1: Evaluation agenda

Period	Tasks	Activities
15 May – 31 May, 2023	Preparation	Review of supporting materials including background documents, project proposal, AWPs, progress reports, technical reports, financial reports, dissemination materials, and publications, etc.
		Submission of the Evaluation Plan to APFNet
		Setting up mission dates and preparation of the detailed mission program in collaboration with the APFNet Project Officer/focal point and EA representatives.
03rd July 08th July, 2023	Data collection and analysis	4th July 2023 (BPSILHK office, Solo, Indonesia) Meeting with the Project Director, project management officials, consultants, and representative of the supervisory agency.
		5th and 6th July 2023 Visits to project sites and visual observations of project interventions, discussions with village officials, Filed Participants, and community members.
		7th July 2023 (BPSILHK office, Solo, Indonesia) Debriefing of the preliminary evaluation results to the project team and representatives of APFNet
10th July – 21st July, 2023	Preparation and submission of the draft report	Additional desk review and intensive analysis of data/information collected during the field visit.
		Drafting the report and submit to APFNet for review and comments.
23rd July – 31st July, 2023	Elaboration of the final report	Receive and incorporate comments of APFNet into the draft report.
		Finalize the report and submit the final report to APFNet.

Annex 2: Project progress table

Items	**Baseline** (In line with PD/AWP)	**Target** (In line with PD/AWP)	**Actual Progress made.** (% completion of activities and degree of output/objective achievement in line with the progress report)		**Evaluator´s brief comments**
Output 1 Preparation of detailed participatory land management plans for the demonstration plots	Not specified	Not specified	Detailed plans prepared for 115 demonstration plots covering approximately 30 Ha		Fully achieved in accordance with the project design.
Activity 1.1 FGD to develop participatory demonstration plot	Not specified	30 FPs in each village.	100%	- farmers meetings were held in all three villages. - FGD participants in each village were 30 people. - The first output was an overview of land conditions, socio-economic and community institutions as a basic information in determining demonstration plot sites - The second output was the detailed planning of participatory demonstration plots	Successfully completed as planned. Absence of the sectoral agencies (BPDAS, CDK) was a disadvantage.
Activity 1.2 FGD among stakeholders to support the implementation of activities	Not specified	02 meetings in each district with 40 participants for each meeting.	100%	- The FGD among stakeholders was held in Karanganyar (June 2021) and Wonogiri (November 2021) District - FGD participants were 40 participants in each district representing institutions, such as BPDASHL, Bapperlitbang, local sectoral institutions, extension agents, NGO, and village government. - The objective of the FGD was to gain support from stakeholders in NMC management. - The output was programs and activities of every stakeholder that potentially support the integrated Naruan Micro Catchment management.	Successfully completed with all stakeholders participating. Although many agencies committed different support services, no significant support has received in the project sites.
Output 2 Establishment of demonstration plots of conservation farming and watershed rehabilitation	Not specified	Not specified	Approximately 30 ha of participatory demonstration plots and 03 ha of non-participatory demonstration plots were established.		Fully achieved in accordance with the project plan.
Activity 2.1 Determining the sites of demonstration plots	Not specified	Not specified	100%	<u>a. Participatory demonstration plots</u> - The team and FPs in three villages worked together in mapping and identifying the physical characters of the demonstration plots area - Completed the delineation of participatory demonstration plot borders including their attributes <u>b. non-participatory demonstration plots</u> - Mapping the non-participatory demonstration plots area - Delineating the demonstration plot border including its attributes	Successfully completed.
Activity 2.2 Applying vegetative soil conservation measures	Not specified	30 ha of participatory demonstration plots. 03 ha of non-participatory plots.	100%	a. Completed the establishment of the participatory demonstration plots in three villages (± 30 ha) - Preparation of planting holes and manure by FP - Distribution of seedlings of perennial crops such as avocado, Albizia, Durio, cacao, nutmeg, according to the design	Successfully completed in accordance with the project plan. However, the vegetative soil

				- Plantation and maintenance of perennial crops (fruit and woody plants) b. Established non-participatory demonstration plots in Wonokeling and Bubakan villages covering an area of 3 Ha. - Arrangement of the demonstration plots design based on phase I experience and market opportunity - Preparation of planting holes and manure - Plantation of perennial crops (coffee, avocado, Albizia, and limpaga)	conservation measures are limited to planting of tree seedlings only.
Activity 2.3 Applying civil technique soil conservation measures	Not specified	23 units of gully control structures - 20 Bamboo structures - 03 Cemented-stone structures	100%	a. Established 23 units of civil technique soil conservation measures in Wonokeling Village - Gully Head structure using gabion construction (2 units) - Gully plug using cemented-stone construction (1 units) - Gully plug using "bamboo construction" (17 units) - Small check dam using cemented-stone construction (2 units) - Small check dam using gabion construction (1 unit)	Successfully completed in accordance with the project plan. No on-farm civil techniques have been used as a soil conservation measure.
Output 3- Enhancement of farmers' skill and income through on-farm and off-farm activities	Not specified	Not specified	12 training programs on 04 subject areas have been conducted involving 270 participants. 30 bee colonies have been distributed free of charge as an incentive.		Achieved to a limited extent. Needs follow-up action.
Activity 3.1 Development of apiculture	Not specified	01 training program for each village. - 30 participants for each training. - 10 bee colonies for each village	100%	a. Trainings were held in November 2021 in all three villages. b. There were 30 participants from each village including representatives of FP's, non-FPs, and village officials. c. Training topics covered theory and practices of apiculture, especially *Trigone spp.* d. Each village received 10 units *Trigone spp*. colonies. e. The trainer was an experienced beekeeper from Klaten District	The trainings have been conducted successfully. However, very few participants currently engage with apiculture. Needs follow-up actions.
Activity 3.2 Training to improve farmer's skill in processing agricultural yields for higher value-added products	Not specified	02 training program for each village. - Coffee growing and processing - Avocado grafting - 15 participants for each training.	100%	Trainings were held in two-phases. a. The phase I training was held in January 2022 in three villages. - Participants were 15 persons in each village - Training materials were Coffee cultivation, post-harvest processing of coffee, and coffee serving technique - The trainers were from a coffee farmer group and coffeeshop owners in Boyolali District b. The training phase II was held in August 2022 - Participants were 15 persons in each village - Training materials were Avocado cultivation and grafting techniques - The trainers were extension agents of Wonogiri District	Trainings have been conducted successfully. However, only few are engaged with intended activities.
Activity 3.3 Training to improve farmer's skill in processing household and agriculture waste		01 training program for each village. - 30 participants for each training.	100%	The trainings were held in two sessions with different topics and participants. - Sessions I was focused on processing household waste (non-organic waste, organic waste, and the managerial aspect of waste management) - Session II was focused on processing agricultural waste	The trainings have been conducted successfully. However, the impact is yet to be visible. Need continuous follow up actions.

				- The trainings were conducted in three villages with 15 participants in each session from each village - The trainer was the Berseri waste management group	
Output 4 Preparation and dissemination of information on the impacts of the demonstration plots of conservation farming and watershed rehabilitation	Not specified	Not specified	Several dissemination materials have been produced including 04 leaflets, 04 posters, and a documentary CD. Data collection for impact monitoring was carried out during the project period.		Partially achieved. Data collection was not systematic. Post-project monitoring is required to illustrate the project impacts.
Activity 4.1 Water yield and sedimentation monitoring	Not specified	04 measurements each year	100%	- Compiled baseline data prior and during the treatment to monitor water yield and sedimentation in 4 outlets of NMC and its tributaries namely Naruan, Branjang, and Muncar spots - The average annual rainfall is 2,877.3 mm, while the average water discharge is 189.40 m3/s or average runoff of 3,076.5 mm/year, as well as sediment yield of 172.23 tons/ha/year. - In terms of quantity, the condition of the water system in the NMC is in quite good condition, demonstrated by the significant abundance of base flow during the dry months.	Successfully implemented during the project period. However, only 3 outlets have been measured. Discontinued after the project completion.
Activity 4.2 Land evaluation	Not specified	03 measurements in first year. 02 measurements in second year.	100%	- Compiled baseline data of land evaluation to predict soil erosion and measure plant growth - Data collected on plant performances (height and diameter) from the demonstration plots Phase I and II - Maintained the seedlings (fertilizing and replanting). Although replanting was not planned but it was still being done to replace dead plants	Successfully implemented during the project period. However, the sample taken was too small. Discontinued after the project completion.
Activity 4.3 Evaluation of economic and social aspect on land management	Not specified	03 times in first year 02 times in second year	100%	- Complied data of household and district economy - Data collected on economic on land management and results of the benefit-cost of farming system - Compiled data on community participation, and community behaviour in soil and water conservation - Information collected on the community awareness related to the importance of soil and water conservation	Successfully implemented during the project period. Data collection was not systematic. Discontinued after the project completion.
Output 5 Make recommendations and prepare policy brief of the best agroforestry model	Not specified	01 Policy Brief	A policy brief was prepared.		Partially achieved. Policy brief is yet to be submitted to the relevant authorities.
Activity 5.1 Internal meeting to discuss and formulate the best agroforestry model	Not specified	02 meetings with 20 participants for each meeting.	100%	a. The participants of the meeting were the project team, the project consultants, the internal monitoring team, and researchers of WMTC. b. The meeting aimed to evaluate the impact of agroforestry model and formulate the best agroforestry model. c. Formulating project report - Semi-annual Progress Report I and II - Annual progress report (ARR)	Meetings have been conducted as planned. No "best agroforestry model" has formulated. Policy brief drafted, but yet to be processed.

				- Final report - CD documentation of project by activities	
Not specified	Not specified	Not specified		The dissemination materials in the form of: - four leaflet topics were produced and printed 70 exemplars from each topic - four poster topics were produced and printed - CD of all project activities documentation were produced with 50 pieces - Policy brief of Participatory Sustainable Micro-Watershed Management Model was drafted.	Even though progress of this activity has been reported under this output, the activity was not specified in the project design. However, significant progress has been achieved under this subject.
Activity 5.2 Workshop to share and discuss the project results	Not specified	01 workshop with the participation of 50 participants	100%	a. Workshop among stakeholders was held in August 2022 b. The workshop was attended by 50 participants representing stakeholders such as steering committee, BPDASHL, Bapperlitbang, local sectorial institutions, extension agents, NGO, and district and village government. c. The objective of the workshop was to gain feedback from stakeholders on the project implementation and stakeholders' commitment for the sustainability of the program.	Successfully completed.

Annex 3: Project overall rating table

Items	Overall Rating[1]
Goal: To build a model of successful watershed management at the operational level (micro catchment). This model may be used as an example of successful watershed management to be applied in other micro catchments.	Satisfactory
Objective: To implement micro catchment management by improving the available plan and extending the impact area, based on community participation and stakeholder collaboration, considering the soil and water conservation principles.	Satisfactory
Output 1: Preparation of detailed participatory land management plans for the demonstration plots	Satisfactory
• Activity 1.1 FGD to develop participatory demonstration plots	Satisfactory
• Activity 1.2 FGD among stakeholders to support the implementation of activities	Satisfactory
Output 2: Establishment of demonstration plots of conservation farming and watershed rehabilitation	Satisfactory
• Activity 2.1 Determining the sites of demonstration plots	Satisfactory
• Activity 2.2 Applying vegetative soil conservation measures	Satisfactory
• Activity 2.3 Applying civil technique soil conservation measures	Satisfactory
Output 3: Enhancement of farmers' skill and income through on-farm and off-farm activities	Moderate
• Activity 3.1 Development of apiculture	Moderate
• Activity 3.2 Training to improve farmer's skill in processing agricultural yields for higher value-added products	Satisfactory
• Activity 3.3 Training to improve farmer's skill in processing household and agriculture waste	Moderate
Output 4: Preparation and dissemination of information on the impacts of the demonstration plots of conservation farming and watershed rehabilitation	Satisfactory
• Activity 4.1 Water yield and sedimentation monitoring	Satisfactory
• Activity 4.2 Land evaluation	Satisfactory
• Activity 4.3 Evaluation of economic and social aspect on land management	Moderate
Output 5: Make recommendations and prepare policy brief of the best agroforestry model	Moderate
• Activity 5.1 Internal meeting to discuss and formulate the best agroforestry model	Satisfactory
• Activity 5.2 Workshop to share and discuss the project results	Satisfactory

[1] OVERALL Ratings are provided based on the six-point ratings scale: Excellent (100), Satisfactory (80), Moderate (60), Unsatisfactory (40), Poor (20) and Not applicable (0).

Annex 4: Reference documents

Indrawati, D. R., Supangat, A. B., Purwanto, Wahyuningrum, N., & Subandrio, B. (2022). Community participation in soil and water conservation as a disaster mitigation effort. *IOP Conference Series: Earth and Environmental Science*, *1109*(1), 012030. https://doi.org/10.1088/1755-1315/1109/1/012030

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Purwanto, Land rehabilitation and income generating challenges. Unpublished

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Annex 5: Survey questions

Questions for the EA

1. What were the mandate, roles, and strategic objectives of WMTC?
2. What is the mandate, roles, and strategic objectives of the current BPSILHK?
3. How do you differentiate the roles of BPSILHK and BPDASHL?
4. How many FGDs were done in the Phase I with community members of three selected villages?
5. Who are the other stakeholders involved in the village level FGDs to develop the microcatchment plan and demonstration plot designs?
6. What are the material/technical supports provided by the other stakeholders for the project interventions?
7. Among the FPs selected for the establishment of participatory demonstration plots, what percentage of them are tenants?
8. What strategies were used to overcome the issue of conflicting interests of landowners and tenants?
9. Who owns the non-participatory demonstration plots?
10. How did you meet the cost of establishing non-participatory demonstration plots?
11. Who will maintain the non-participatory demonstration plots? And who will derive the products and benefits?
12. What are the criteria used to select locations for gully control structures?
13. Were there any gully control measures constructed by the villagers before the project?
14. Who proposed training program on apiculture to be used as a livelihood development strategy?
15. What is the mechanism to select beneficiaries among training participants to provide bee colonies free of charge?
16. How many of trained participants are presently engaged in apiculture?
17. How many percentages of participants selected for coffee cultivation and avocado grafting were FPs?
18. How many participants are currently engaged with coffee processing/avocado grafting?
19. How often the hydrological data were collected during the project period? Who will do this after the project and how often?
20. What is the reason to avoid hydrological data collection at the "Anget" outlet?
21. What is the reason for the runoff and sedimentation readings at the final NMC outlet is lower than expected?
22. How often the land evaluation was carried out in selected sample plots? What are the parameters measured?
23. How did you measure benefit-cost of farming systems? What parameters were used?
24. What are the criteria used to measure the level of community participation in demonstration plots?
25. It was indicated in the project proposal that a book will be produced on "Planning of NMC management". Was it produced?
26. After the evaluation conducted by the supervisory agency (BD2SDM), it was recommended to design a "exist strategy" for the project. Was it designed?
27. BD2SDM, FORDIA as well as APFNet board member (Advisor to the MoEF) recommended to replicate the project model in other areas. Has any organization(s) done that, or planning to do that?

28. In the project proposal, it was planned to formulate a "best agroforestry model". Was any model selected as best agroforestry model among the different models tried out during the project?
29. Did all invited (identified) stakeholders attend the final workshop?
30. Is there any development observed among the stakeholders regarding the project model after the final workshop?
31. How was the demonstration plot management were handed over to the local government as indicated in the project proposal? What mechanism used to this handing over?
32. Similarly, how were the civil structures were handed over to village government?
33. In project documents, the terms "village government" and "local government" were both used. Are they synonyms?
34. What is the role of forestry extension agents of BP2SDM with regard to the follow-up actions of the project interventions?
35. What follow-up mechanism is in place for the livelihood development strategies carried out by the project?
36. Are there any additional SWC measures implemented by the FPs beyond project support? If so, do you have any record of those?
37. Are there any non-FPs replicated project supported SWCs by their own?
38. What went wrong, or what are the areas that could have been done better when implementing this project?
39. To whom the policy brief was addressed?
40. What is the current status of implementing recommendations of policy brief?
41. Although a disintegration of agencies has been identified as a major issue in the policy brief preamble, why there is not any recommendation included to address that issue?

Questions for the Supervisory Agency (SA)

1. What is the mandate of BP2SDM? What is the organizational structure?
2. What made BP2SDM to be identified as the SA of this project, while WMTC was functioning under FORDIA, not BD2SDM?
3. What is the role of territorial Forest Extension Agents operating under BD2SDM. How did they involve with this project?
4. What is the basic level of education of the Forest Extension Agents?
5. Who supervise the day-to-day work of Forest Extension Agents?
6. What role played by the BD2SDM in supervising this project? How it was different from the role played by the FORDIA?
7. How often BD2SDM officials visited the project sites?
8. What are the weaknesses/drawbacks observed by the SA with regard to this project?
9. BD2SDM recommended WMTC to develop a exist strategy to this project. Was it prepared and submitted?

Questions for the consultant (Soil and water conservation specialist)

1. How long you have been working with the WMTC/BPSILHK?
2. What is your opinion about the project design? Can it be further improved in relation to SWC aspects?
3. What is your assessment about the SWC techniques included in the project design? Are they sufficient to make a tangible impact on the NMC?
4. What additional measures could have been included without significant financial burden to the project budget?

5. How do you rate the success of SWC measures implemented by the project with regard to their impact and sustainability?
6. What is the potential of project SWC measures being replicated elsewhere without a project support?
7. To what extent your technical inputs were followed by a) WMTC officials and b) FPs?
8. What is your assessment of the capacity of WMTC officials to replicate this model without any consultancy input from a SWC consultant expert?
9. What were the major challenges encountered with regard to the implementation of SWC measures of the project?
10. What is your overall assessment about the success, sustainability, replicability, and scale-up potential of the project.

Questions for the village government officials

1. How useful was the project to the village? What are the perceived benefits that will derive from that?
2. Do the project interventions inline/complementary with the village development plans/strategies?
3. To what extent the village government involved/contributed to the implementation of project activities?
4. What project component is the most beneficial and appropriate to the village?
5. How do you rate the interest of village members towards the project activities?
6. Do you think the selection of project participants/beneficiaries have been done appropriately without any bias or injustice?
7. How do you rate the sustainability of SWC measures introduced by the project?
8. Do you think the community members will replicate the SWC measures introduced by the project in future, without a project support?
9. What are the major challenges encountered in enhancing the livelihoods of the village community? ′
10. What are the potentials/opportunities available to be used to develop the village and enhance the livelihoods of the community?
11. Do you think the livelihood development programs implemented by the project were chosen appropriately? If not, are there other options to enhance the livelihoods of village members?
12. What went wrong, or what are the areas that could have been done better when implementing this project?
13. In what ways the village government can support/contribute to the sustainability and duplicability of project interventions?

Questions for Field Partners and non-participants

NB: The interviews with community members were conducted on a wider open-ended manner. The strategy used was to invite them to describe their experiences and opinions on different project interventions freely. On most occasions, community meetings have been arranged in group format. Questions were asked when it requires further clarifications or to raise any specific issue, without disturbing the dialogue, whereas some specific details were asked form appropriate respondents. Important information was noted down and analysed to make appropriate judgements.

Annex 6: Lists of interviewees

Project Staff

1. Dr. Agung Budi Supangat - Project coordinator/National Expert (Forestry, Watershed hydrology)
2. Dr. Nining Wahyuningrum - National Expert (Forestry, Soil and Water Conservation, Mapping (GIS)
3. Dr. Dewi Retna Indrawati - National Expert (Community Development)
4. Ir. Purwanto, M.Sc. - National Expert (Natural Resource Economics)
5. Mr. Dody Yuliantoro, S.P., M.Ling. - Research Assistant
6. Mr. Bambang Subandrio, B.Sc. F - Research Assistant
7. Mr. Edi Sulasmiko, S.P. - Research Assistant
8. Ir. Yoyok Sigit Haryotomo, MM. - Head of BPSILHK Solo

BP2SDM

1. Mr Hasto Nugroho, M.B. A - Representative of P2SDM

Consultants

1. Dr. Dwi Priyo Arianto - Soil and water conservation specialist.

Community level

Wonorejo Village

1. Mr Mbah Simun - Field partner (former village head)
2. Mr. Wanto - Filed Partner
3. Mr. Yanto - Coffee processor
4. Mr. Budi Santoso - Coffee processor

Wonokeling Village

1. Mr. Agus Sarwoko - Village Secretary
2. Mr. Giman, W.G. - Field partner
3. Mr. Tukino - Filed Partner
4. Mr. Supri - Filed Partner
5. Mr. Sunarti - Filed Partner
6. Ms. Sumadi - Filed Partner
7. Mr. Maryano - Member of Karan Taruna Nursery Group

Bubakan Village

1. Mr. Supri - Filed partner.
2. Mr. Rakimin - Field Partner
3. Mr. Mulyano - Filed Partner