

Summary of the Results of the Evaluation Survey

1. Outline of the Project	
Country: The Republic of Ghana	Project Title: Enhancing Resilience to Climate and Ecosystem Changes in Semi-Arid Africa: An Integrated Approach
Issue Sector: Rural Development	Cooperation Scheme: Science and Technology Research Partnership for Sustainable Development (SATREPS)
Division in Charge: Rural Development Department	Total Cost: Approximately 403 Million Japanese Yen
Period of Cooperation: From 15 March 2012 to 14 March 2017 (by R/D)	Partner Country's Implementing Organization: University of Ghana (UG), Ghana Meteorological Agency (G-Met), University for Development Studies (UDS), United Nations University Institute of Natural Resources in Africa (UNU-INRA), Water Resources Committee (WRC), Water Research Institute (WRI)
	Implementing Organization: The University of Tokyo, Kyoto University, United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS).
	Supporting Organization:
<p>1-1 Background of the Project</p> <p>Northern regions of Ghana are largely semi-arid and vulnerable to climate change. The majority of its residents practice subsistence agriculture and inevitably remain poor, and accelerated north-to-south outmigration of youth is debilitating the regions' natural resource management base. The Government of Ghana, therefore, requested the Government of Japan in 2011 for technical cooperation by joint research under the program of the Science and Technology Research Partnership for Sustainable Development (SATREPS), and Japan International Cooperation Agency (JICA) launched in May 2012 a five-year project entitled "Enhancing Resilience to Climate and Ecosystem Changes in Semi-arid Africa: An Integrated Approach." The Project aims to develop a Model, by integrating approaches to enhance resilience to climate and ecosystem changes, to enable local communities to overcome their vulnerability in natural resource management. The Project targets the Volta River Basin, the most vulnerable area in the semi-arid northern Ghana in terms of natural resource management.</p> <p>The implementation structure of this technical cooperation consists of the University of Ghana (UG), Ghana Meteorological Agency (G-Met), University for Development Studies (UDS) and the United Nations University Institute for Natural Resources in Africa (UNU-INRA) for the Ghanaian side, and The University of Tokyo, Kyoto University, and the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) for the Japanese side.</p> <p>As the Project comes to a close in six months, JICA dispatched a Terminal Evaluation Team to jointly evaluate the Project's progress with the Ghanaian side, against the indicators set out in the Project Design Matrix (PDM) using the five criteria (relevance, effectiveness, efficiency, impact, and sustainability) indicated in the Joint Mid-term Evaluation report prepared in September 2014. The Terminal Evaluation intends to provide recommendations to relevant parties in view of achieving the Project's expected Outputs and Purpose in the remaining cooperation period.</p>	

1-2. Project Overview

(1) Overall Goal:

The Integrated Approach to Enhancing Resilience to Climate and Ecosystem Changes will be incorporated in international environmental policies.

(2) Project Purpose:

An Integrated Approach to Enhancing Resilience to Climate and Ecosystem Changes in Northern Ghana will be developed as the 'Ghana Model', enabling target groups to overcome the vulnerability of natural resource management.

(3) Outputs

Output 1: Forecasting methods for climate and ecosystem change are developed and the impacts on agro-ecosystem use are assessed.

Output 2: Prototype of water resources management is applied through prediction and risk analysis of extreme weather events using satellite remote sensing and ground-based observation network.

Output 3: Institutional and engineering capacity development programs for local communities and engineers are developed and implemented.

(4) Input (As of the terminal evaluation)

Japanese Side:

- Total budget: Approximately 403million Japanese Yen

- Japanese Experts:

21 Short-term Experts have been dispatched to the Project since May 2012 in the field such as Chief Adviser, GIS Analysis, Meteorology, Flood Management, Disaster Risk Management, Resilience Evaluation, Resilience Strategy, and Agronomy. The total duration of their assignments by the end of August 2016 is 47.77 man-months.

2 Project Coordinators have been dispatched; the total duration of their assignments by the end of July 2016 is approximately 52 man-months (Total 1516 days, 50.02 M/M)

- Project operational cost: 94.9 million Japanese Yen (3 million Ghana Cedi)

- Provided Equipment: Machinery and equipment, including Data Servers, Elemental Analyzer, Automatic Weather Station, Electronic Meeting System, have been provided for project activities. The total amount of procurement is 94.9 million JPY (3million GHS).

- Training in Japan and other countries: The total number of the Ghanaian counterpart personnel accepted for training in Japan is 23 persons.

Ghanaian Side:

- Counterparts: 53 persons (20 from UG, 8 from G-Met, 16 from UDS, 5 from UNU-INRA, 3 from WRI and 1 from WRC).

- Lands and Facilities: The five project offices, including utility costs for project personnel, were provided by UG, G-Met, UNU-INRA, and UDS (Nyankpala and Wa campuses). Installation sites for the equipment were provided, and lands for Automatic Weather Stations (AWS) and Automatic Rain Gauges (ARG) were made available. A GIS Resource Center has been established by UNU-INRA on its premises.

2. Evaluation Team			
Members	Designation	Name	Organization
Japanese Side	Team Leader	Mr. Hajime Nabeta	Senior Assistant Director, Team-4, Rural Development Department, Japan International Cooperation Agency (JICA)
	Science and Technology Evaluation	Dr. Yoshifumi Yasuoka	Senior Research Supervisor, Japan Science and Technology Agency (JST) Prof. Emeritus, The University of Tokyo
	Science and Technology Evaluation	Ms. Mari Takagi	Program Officer, Dept. of International Affairs, Research Partnership for Sustainable Development Group, JST
	Evaluation Analysis	Mr. Okano Teppei	Consultant, Icons Inc.
Ghanaian Side	Team Leader	Mr. Ernest Wesley-Otoo	Development Partners Coordinator, Ministry of Education
	Member	Mr. Ali Mohammed	Head of Cooperation, Japan, Korea and China Desk, Ministry of Finance
	Member	Mr. Austin Hesse	Deputy Director, Policy Planning and M&E Directorate, Ministry of Communication
	Member	Mr. Ahmed Gibrilla	Assistant Agriculture Officer, Environment, Land And Water Management Unit, Ministry of Food and Agriculture
Period of evaluation	From 8 August 2016 to 24 August 2016		Type of Evaluation: Terminal Evaluation
3. Results of Evaluation			
3-1 Verification of Achievement			
(1) Progress of Activities			
<p>Activities have been conducted according to the PO, and most of the activities related to Output 1 and Output 3 have been implemented without significant delay. As to Output 2, although some activities were slightly delayed due to limited number of human resources and unstable utility infrastructures (power supply and communication network), all the activities are now expected to be completed by the end of the Project because of the Project's adequate remedial measures. There were some difficulties reported in the first half of the Project with: 1) coordination and communication among the Project personnel; 2) mutual understanding on budgetary system of the Project; and 3) timely collection of necessary data. However, these difficulties have been mostly overcome by the continuous efforts of both Japanese and Ghanaian Project members.</p>			
(2) Level of the achievement of Outputs			
Output 1			
<p>Although some research activities are still on-going, Indicators 1.1 and 1.3 have been already achieved, and Indicator 1.2 is expected to be achieved by the end of the Project.</p> <p>Based on the above research activities, 10 research papers have been published including the journal articles on climate and ecosystem change (Indicator 1.1). Currently, the thematic group-1 is proceeding with the assessment of climate change impact to agro-ecosystem utilizing climate change forecasting</p>			

information, field data from demonstration plots and crop models established through the research activities, which are all products of Output 1. In addition, the maps using GIS for land utilization and cropping system are in the process of development, and these maps will be utilized by the Ghanaian side even after the completion of the Project (Indicator 1.2). In order to propose an appropriate farming system at target communities, the thematic group simulated the impacts of fertilizer application for major crops with field experiments and identified the key strategies to improve on the yield gaps between different maize varieties under four treatments. Intensive household surveys have been conducted and the land use change in the communities was understood. On the basis of the results, options of adaptive agricultural production management to climate change were reported in various workshops, project documents and presentations (Indicator 1.3).

Output 2

Indicator 2.1 and Indicator 2.2 have not yet been achieved. Although the research activities related to risk assessment and water resource management have not yet completed at this point, there is no notable delay on these activities, and these indicators are expected to be achieved by the end of the Project. Indicator 2.3 have been achieved already.

Since numerical weather prediction is important in forecasting extreme weather events, totally 5 forecasters from G-Met have studied in Japan and computer servers have been installed in G-Met headquarters. The system for automatic forecasting is now under construction. Due to delay in the collection of hydrological data, flood risk assessment is not in a practical level so far, though the thematic group-2 is developing a methodology for monitoring flood areas and a hydrology model to predict river discharge and inundation. These are to be used for emergency warning, early warning or production of hazard maps for extreme weather events (Indicator 2.1). The thematic group also has compiled the findings as a result of surveys assessing vulnerability to floods and droughts, current water resources management, and locally appropriate water resources management methods. The results of on-going field experiments will be added to the above findings and the prototypes of water resource management methods will be reported by the end of the Project (Indicator 2.2). On the basis of the above research activities, 14 research papers have been published including the journal articles on extreme weather risk or water resource management (Indicator 2.3).

Output 3

Indicators 3.1, 3.2 and 3.3 have been achieved at the time of terminal evaluation. Activities related to indicators 3.4 and 3.5 are scheduled to be completed in March 2017 according to PO and, since there is no delay on the activities, both indicators will be achieved by the end of the Project.

Based on the research activities under Output 3, 15 research papers have been published including the journal articles on regional disaster governance in Northern Ghana (Indicator 3.1). Thematic group-3 studied the material flow of shea production and introduced simple improved cook stove to reduce fuel wood consumption in shea production. Also value chain surveys for crops, such as okra, pepper and maize were conducted. Bee keeping with crop production was demonstrated as livelihood diversification and ecosystem enhancement strategy. These studies were conducted for development of business models against climate and ecosystem changes and reported already (Indicator 3.2). Regarding capacity development on resilience against climate and ecosystem changes, new disaster risk reduction education program was suggested to teachers and staffs of Ghana Education Service; also environmental community theatre was held in 5 places to raise awareness of the community members (Indicator 3.3). Institutional and technological capacity development for local leaders and practitioners will be implemented in the

co-design manner by the end of the Project, based on findings of the stakeholder analysis, socio-economic survey, local business models and capacity assessment as well as findings from theme 1 and 2 (Indicator 3.4). Guidelines for establishing an integrated approach to enhancing resilience to climate and ecosystem changes are planned to be developed and presented by the end of the Project (Indicator 3.5).

(3) Level of the achievement of Project Purpose

The development of an integrated approach to enhancing resilience to climate and ecosystem changes in Northern Ghana, as indicated in the Project purpose, is expected to be achieved, with some rooms for further continuous improvement, with the observed strong ownership and active involvement of Ghanaian stakeholders.

Indicators 1 and 2 are expected to be achieved by the end of the Project. Indicator 3 have been achieved already and further contribution to the on-going policy formulation is expected. The working structure to continue further studies for downscaling will be set up at UG by the end of the Project and new programs for enhancing resilience will be developed at UG and UDS. Although it is not the education policy at university level stated in Indicator 1, the study on syllabus analysis of primary and secondary education has been conducted to integrate climate change and disaster management into their educational curriculum (Indicator 1). The structure of the operation of forecasting method utilizing skills and equipment provided by the Project was established and will be utilized by G-Met as well. Since the importance and the usefulness of prediction and risk analysis using satellite data and ground-based observation data are highly recognized by G-Met, the Project has contributed to reinforcing the capacity building policy of G-Met (Indicator 2). Even though some parts of the policy formulation are out of control of the Project, some Project members are in the position to directly contribute to policy formulation of several national strategies. A member of thematic group-1, Dr. Kawadu Owusu is a principal author of the National Climate Change Adaptation Strategy. A member of thematic group-3, Dr. Godfred Seidu Jasaw is a former National Development Planning Commission (NDPC) member and is expected to transfer the knowledge and make the Project's outcomes accessible to policy makers (Indicator 3).

(4) Level of the achievement of Overall Goal

Necessary and important steps are being taken by the Project with a positive prospect for Indicator to be achieved several years after the completion of the Project if the Ghanaian C/Ps continue efforts for research, implementation and monitoring of the various components of the Ghana Model. The capacity building by the Project, especially for Ghanaian C/Ps, have been adequately conducted and it is expected that these C/Ps lead the further improvement of Ghana Model in the Post Project period. The collaboration structure among universities both in Ghana and Japan is also expected to be continued through the operation of KTCSR.

The Project has worked toward the achievement of the Indicator and the prospect of attainment of the Indicator is positive. In order to make the Ghana Model applicable to other African countries, the Project is in the process of analysing socioeconomic situations, legal systems, political systems, religious situations of the countries interested in the model. In the short term, information sharing related to Ghana Model is being promoted through University network established by other UNU's research activities in Africa.

3-2 Summary of Evaluation Results

(1) Relevance (High)

The Project is consistent with existing strategies and policies of Ghana related to the resilience to

climate and ecosystem changes. The Government of Ghana formulated Ghana National Climate Change Policy (NCCP) in 2014, which emphasizes the importance of enhancement on national resilience to disaster, and active and effective risk reduction. The second Ghana Shared Growth and Development Agenda (GSGDA II, 2014-2017) also puts high priorities on climate variability and change. The Ghana National Climate Change Master Plan Action Programmes for Implementation (2015-2020) is in line with the objective of the Project as well. Also the Project is in line with the “Country Assistance Policy for the Republic of Ghana” formulated in April 2012 by the government of Japan. Its priority areas include agricultural development and the Project is regarded under the above prioritized area. JICA also has actively extended support to mitigation, adaptation, and the mechanism to accelerate mitigation and adaptation in partner countries. Ensuring inclusive, resilient, and environmentally sustainable growth is one of key elements under JICA’s principle toward achievement of the SDGs.

(2) Effectiveness (Relatively High)

The Project Purpose, the formulation of the Ghana Model, as indicated in its statement, is expected to be achieved, with some rooms for further continuous improvement. The Project compiles the various findings of each thematic group and all process and results will be integrated into Ghana Model by the end of the Project. KTCSR have been established in UDS for improvement of sustainability and resilience to climate and ecosystem change in Africa. It is expected that the centre promotes further improvement and implementation of Ghana Model with continual efforts with contribution by the Ghanaian C/Ps. All Outputs were designed to contribute to the achievement of the Project purpose aiming at the development of an integrated approach to enable target groups to overcome the vulnerability in natural resource management. Studies on the resilience of ecosystem and agricultural production (Outputs 1), the resilience of engineering (Output 2) and the resilience of social system and capacity development (Output 3) are to be integrated to develop the Ghana Model. These Outputs are indispensable for achieving the target of the Project.

(3) Efficiency (Relatively High)

The quality, volume and timing of the Project inputs by both Japanese and Ghana sides have been adequate in general, which led to the achievement of the Outputs. Although there had been some difficulty in the initial stage in building common understanding on internal rules and procedures of the Project among project members, the Project activities are appropriately implemented by efficient project management at the time of the terminal evaluation. Various outreach activities have been conducted at the local level, such as match making workshops, stakeholder meetings, community workshops, a community theatre, and so forth. Constant feedbacks through these activities have been valuable inputs to formulate an integrated approach.

(4) Impact (Relatively High)

The prospect for the achievement of the Overall Goal is positive with continued efforts for research, implementation and monitoring of the various components of the Ghana Model. The objective of the Project is highly consistent with the climate change policy of the Government of Ghana and there is high possibility that the integrated approach developed by the Project would be applied to the other regions in Ghana. Also, the Ghana Model has positive prospect of replicability in other areas of sub-Saharan Africa, considering the efforts being made by the Project members such as presentation planned at international conferences and hosting of international conferences, even though concrete outcomes have yet to be obtained from these approaches at this moment.

Other positive impacts have been observed at the local level such as awareness raising and behaviour change of local community members towards climate change and disaster risk reductions. Another positive impact is expected at the national level. Since the outcome of the Project will fit in the national policies and strategies of Ghana, the important findings of the Project will contribute to the ongoing policy formulation, especially the 40-year Development Plan of Ghana.

(5) Sustainability (Moderate)

Political Aspect: The objective of the Project is highly consistent with the current national development plan and climate change policy of the Government of Ghana, such as NCCP. The issues of vulnerability on climate and ecosystem change are captured in the 40-year Development Plan as well. In view of those policies, it is assumed that the policy support would continuously be secured in the post Project period.

Financial Aspect: It is observed that financial resources allocated for the C/Ps by the Government of Ghanaian have been limited. While the Team deems the financial sustainability of the C/Ps' activities has not yet been secured, as each C/P makes relevant efforts to obtain funds from alternative sources, such as international research funds and other cooperation schemes by development partners, the scope of financial sustainability is positive.

Organizational Aspect: While a series of workshops, demonstrations and community theaters at the local level will continue to enhance the mind set required for resilience of local communities, it needs time to establish the Project's approach. Establishment of KTCSR by UDS is one of the most important exit strategies of the Project, and it will lead further research and capacity building of stakeholders. In addition, the project has been making efforts in incorporating Ghana Model approaches into training program of C/Ps to secure the institutional sustainability. However, it is difficult to assess "integration sustainability" of Output 1, 2 and 3 at this time, since the integration scheme of the three Outputs is not yet clearly identified.

Technical Aspect: Each research theme is common to the C/P's own theme, and capacity building has been conducted in line with their regular duties. The research methods and outcomes of the Project will be continuously used by them. The Project has trained a number of young researchers by various means and fostered the understanding of climate and ecosystem changes; they are the potential human resources and professionals of the concerned fields and can outreach to local communities in the future.

3-3 Contributing Factors

(1) Establishment of mutual understanding through good coordination

In addition to the communication among the researches in each thematic group, the Project assigned a project coordinator as a long term expert. Since a large number of experts, researches have been involved in the Project, the coordination and arrangement by the coordinator hugely contribute to the smooth implementation of the Project activities. On the other hands, at the initial stage of the Project, there was difficulty to build a mutual understanding among the Project members related to internal rules and procedure of the Project. Obviously, this is because JICA's cooperation project, different in the practice from other research funds, was new to the Ghanaian C/Ps. Due to that difficulty, some activities had not been conducted as planned. However, as the mutual understanding improved through smooth coordination and communication, the issue has been solved to a large extent.

3-4 Constraining Factors

(1) Unstable utility infrastructure

Unstable utility infrastructure, such as electricity supply and telecommunication network in northern

Ghana, had constrained several research activities under thematic group-2. Provided equipment, especially data servers, AWSs and ARGs, rely on such infrastructure, and continual data accumulation had been sometimes difficult. The situation regarding the power supply was improved in G-Met by installing a high capacity uninterruptible power supply (UPS) and generators. AWSs and ARGs, which uses mobile communication network to transmit the data to the server, have failed to send the data properly at some installation points.

3-5 Conclusion

The activities have been conducted according to the PO and most of activities related to Output 1 and Output 3 have been implemented without significant delay. Although some activities of Output 2 have slightly delayed, the Project purpose is expected to be achieved by the end of the Project period. From the perspective of the five evaluation criteria, the relevance of the Project is assessed as High since the enhancement of resilience to climate and ecosystem changes are one of the high priorities of the Government of Ghana, and secondly, the Project's target is in line with the national development plan. The effectiveness of the Project is deemed as Relatively High. The Project purpose is highly expected to be achieved by the end of the Project. The efficiency of the Project is also assessed as Relatively High. Most inputs necessary for successful implementation of the Project activities have been allocated as planned. The timing, quality and volume of input by Ghanaian and Japanese sides are deemed appropriate. The Project's impact was adduced to be Relatively High due to its high possibility of achieving the overall goal by continual efforts by the Ghanaian side. The sustainability of the Project is assessed as Moderate. Though political and technical sustainability is expected to be secured, organizational and financial sustainability remains an issue.

3-6 Recommendations

3-6-1 Recommendations for the remaining Project period

(1) Clarification of the Ghana Model

Since the development of an integrated approach of enhancing resilience to climate and ecosystem changes in northern Ghana, as the Project purpose, is in its final stage, all partners are strongly encouraged to accelerate its final works, maintaining the present momentum. Toward achieving the Project purpose, the Team recommends the Project to clarify the Ghana Model on what aspects are common and applicable to other areas and what aspects need customization to specific settings of project areas. Since the Ghana Model is meant for application in neighboring countries, the Model also needs to identify the roles of different stakeholders and the advantage of the Model.

(2) Strengthen tie with local government

As the Project carried out many activities closely related to the services the local government provides the residents such as agricultural extension and construction of deep wells, the Project should strengthen its ties with the local government so that the important activities would be continued and shared with other areas.

(3) Incorporation into education policies

Since the project produced valuable Outputs from educational point of views, the Team recommends that relevant parties take steps to incorporate these outputs of the Project in the education policies of Ghana for the enhancement of resilience and sustainability.

(4) Support to formulation and implementation of relevant national policies

The objective of the Project is highly consistent with the current Ghana National Climate Change Policy (NCCP: 2014), and the Ghana National Climate Change Master Plan Action Programmes for Implementation (2015-2020) which serves as the implementation tool for the Policy. It is recommended that collaborating institutions enable implementers of these documents to access the scientific findings produced under the Project to enhance climate change mitigation and adaptation interventions in Ghana. Also, although some parts of the policy formulation are out of control of the Project, enhancement of resilience against climate and ecosystem change is one of the major issues on the upcoming policy and strategy formulation, such as the Long Term National Development Plan, where active involvement of the Project personnel is known, their substantive contribution to the policy formulation is highly expected.

(5) Identification of integration scheme

The Ghana Model is a process which requires continuous research, implementation and monitoring; therefore all actors are encouraged to be involved in the process to improve the model. However, there is no clear identification of integration scheme of the three Outputs. The Team recommends the Project to identify which data, information and knowledge from Output 1 and Output 2 are utilized in Output 3 and how to use them. Integration scheme need to be clearly described and examined by the end of the Project.

3-6-2 Recommendations for the post Project period

(1) Adequate budget allocation

For further enhancement of resilience using outcome of the Project, the Ghanaian stakeholders will be required to secure necessary budgets for research and outreach activities as well as maintenance of the equipment. The establishment of KTCSR by UDS being a significant step to build up local resilience using the works of different stakeholders, the Team recommends the relevant authorities, in particular the Ministry of Education, takes steps to secure relevant budgets to support the center. Also the Project has built significant capacities with G-Met for timely collection of weather and other relevant data that assist local populations and international communities. To make this practice sustainable, G-Met and relevant authorities are strongly encouraged to secure necessary budget lines to support regular maintenance works of the installed AWSs and ARGs with trained personnel.

(2) Sustainable collaboration scheme among Ghanaian stakeholders

UG, G-Met, UNU-INRA, UDS, WRC, WRI and the relevant stakeholders are recommended to establish sustainable collaboration scheme so that a platform be established for further upgrading of the Ghana Model and future utilization of the Model for social profit.

3-7 Lesson learned

None

3-8 Follow up

None