Internal Ex-Post Evaluation for Technical Cooperation Project (SATREPS[1])

conducted by Ghana Office: February, 2025

Country Name	**Enhancing Resilience to Climate and Ecosystem Changes in Semi-Arid Africa: An Integrated Approach**
Republic of Ghana	

I. Project Outline

Background	The semi-arid northern part of Ghana, covering the three regions of Northern, Upper East, and Upper West, is not only the poorest area in the country but also a vulnerable area against natural disasters including floods. In the three regions, actions against climate change became an urgent issue because their main economic activities were linked to the agriculture sector which was easily affected by the negative impacts of climate change. Although the grassroots disaster management activities at the community level have been partly implemented, countermeasures against natural disasters and natural resource management capacity of the community, local administration officers and engineers were not sufficient to cope with the natural disasters.		
Objectives of the Project	Through development of forecasting methods for climate and ecosystem changes, application of prototype of water resource management, and development and implementation of institutional and engineering capacity development program for local communities and engineers, the project aimed at development of an Integrated Approach to Enhancing Resilience to Climate and Ecosystem Changes in Northern Ghana as "the Ghana Model", thereby contributing to incorporation of the model in international environmental policies. 1. Envisaged 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.		
Activities of the Project	1. Project Site: Tolon District (Northern Region) and Wa West District (Upper West Region) 2. Main Activities: 1) Developing regional climate change prediction model and agr-ecosystem valuation map, 2) Establishing an early warning system, developing hazard map of flood and proposing prototype scheme of on-site water resource management, 3) Developing institutional capacity development program, engineering models/solutions for natural resource management capacity development program and an integrated approach to enhancing resilience, etc. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 23 persons 2) Trainees Received: 22 persons 3) Equipment: Data servers, elemental analyzer, automatic weather stations (AWSs), automatic rain gauges (ARGs), electronic meeting system, etc. 4) Local operation cost: Refurbishment of the project office, travel expenses, fuels costs, cost of Geographic Information System (GIS) training, cost for workshops, etc. Ghanaian Side 1. Staff allocated: 53 persons 2. Facilities and land: five project offices, sites for equipment provided by the SATREPS project, lands for AWSs and ARGs 3. Local operation cost: Utility costs for the five project offices, construction costs for the GIS Resource Center (United Nation University Institute for Natural Resource in Africa: UNU-INRA)		
Project Period	(ex-ante) March 2012 – February 2017 (actual) March 2012 – March 2017	Project Cost	(ex-ante) 458 million yen, (actual) 402 million yen
Implementing Agency	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)		
Cooperation Agency in Japan	The University of Tokyo, Kyoto University, United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS)		

II. Result of the Evaluation

[Constraints on this ex-post evaluation]

Although many researchers and counterpart staff from various institutions of the Ghanian side had participated in the SATREPS project, it was difficult for the ex-post evaluation team to have access to the key informants partly due to the several factors of the pandemic of COVID-19 in Ghana, retirement and leave of post by officers who participated. As a result, information for the ex-post evaluation was collected from the limited key informants of UG and UDS but not from G-Met. Therefore, the ex-post evaluation referred "the Follow-up Review Report" for this SATREPS project, which was prepared by the Japan Science and Technology Agency (JST) in March 2022 and supplementary collected necessary information.

[Special perspective to be considered in the ex-post evaluation]

(Verification of the Indicator 3 for the Project Purpose at the time of ex-post evaluation)

Since the Indicator 3 for the Project Purpose, "contribution to the ongoing policy formulation for climate adaptive capacity development by the government of Ghana", is closely linked to the Indicator for the Overall Goal, "policy recommendation shared in the science and technology community and presented to international panels and convention", it was verified as a factor affecting the achievement level of the Overall Goal.

[1] "SATREPS" refers to the "Science and Technology Research Partnership for Sustainable Development."

1 Relevance

<Consistency with the Development Policy of Ghana at the Time of Ex-Ante Evaluation>

The project was consistent with the national development policies of Ghana such as "the Ghana National Climate Change Policy (NCCP)" (2012 and 2013) aiming at enhancement on national resilience to climate change.

<Consistency with the Development Needs of Ghana at the Time of Ex-Ante Evaluation>

The project was consistent with development needs of Ghana to improve countermeasures against natural disasters in northern semi-arid area of the country since the major economic activities in the area was vulnerable to natural disaster and sensitive to negative effect of climate change.

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with the "Country Assistance Program for the Republic of the Ghana" (2006) prioritizing supports for the revitalization of rural areas. In addition," the 4th Tokyo International Conference on African Development (TICAD IV) Yokohama Action Plan" (2008) highlighted to address environmental/climate change issues including "Adaption" against natural disaster as one of the TICAD process to support for Africa including Ghana.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose was partially achieved by the time of project completion. No educational policy to focus climate and ecosystem changes was developed while a new program for strengthening resilience was to be developed at UG and UDS (Indicator 1). Although no educational policy for engineers was elaborated, the observation capacity of G-Met was reinforced through establishment of structure to operate forecasting methods. (Indicator 2). Since a member of the project team member from the Ghanian side became the lead author of the National Climate Change Adaptation Strategy during the project implementation, the research outputs of the SATREPS project were able to be reflected to policies of Ghana (Indicator 3).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been partially continued at the time of ex-post evaluation. The key research outputs have been integrated into many aspects of the department curriculum of UG such as climate ecosystems change and GIS, disaster management and applied geomorphology, and many others. Also, publications from the research by the SATREPS project are being used widely by lecturers, postgraduate, MPhil and undergraduate students in teaching and research. In addition, the Sustainable Integrated Rural Development in Africa (SIRDA) study program, including Masters/ MPhil, and Ph.D. programmes, under the Education for Sustainable Development in Africa (ESDA) project[2]. The study also drew a lot of inspiration and experiences from the SATREPS project especially from its methodological approach focusing on researcher-community relationship and participation as part of their experiential activity. Furthermore, UDS has worked with communities and district local government capacity building, by training communities and district extension staff in enhancing local products, such as drying pepper, extracting honey and so on., and producing suitable training materials for developing alternative livelihood strategies in response to ecosystem changes. According to UDS, the communities have integrated the technologies into their livelihood development strategies.

The research equipment installed in UDS by the SATREPS project have been utilized by the Research Center for research and teaching. On the other hand, the status of 10 AWSs installed in G-Met was not able to be confirmed directly because of no response from with G-Met with in the survey period for the ex-post evaluation. According to the "JST Follow-up Review Report", it was confirmed that the weather forecasting system using the equipment was in operation and the forecast results were updated on the website of G-Met until June, 2019. However, after the change in specification of the system of the National Centers of Environment Prediction, which is the data input source, in June 2019, the weather forecast system of G-Met has been required to change a part of the software.

<Status of Achievement for the Envisaged Overall Goal at the time of Ex-post Evaluation>

The Envisaged Overall Goal was partially achieved at the time of Ex-post evaluation. There was no discussion about how to utilize the policy recommendations based on the key research outputs by the SATREPS project at the final stakeholder's/ collaborators' meeting which was organized before the project completion. On the other hand, according to the JST Follow-Up Review report, before the project completion, "Food Security Impacts of Collaborative Research Action Industrial Crop Expansion in Sub-Sahara Africa" was planned and adopted as a Collaborative Research Action (CRA) of the Belmont Forum[3] under the Strategic International Research Cooperation Program of JST. The research project was conducted by researchers of the University of Tokyo and researchers from the United Kingdom, the Republic of South Africa as well as the United Nations University (UN University) for the period from 2015 to 2017. In addition, for the period from 2017 to 2019 after the completion of the SATREPS project, "Development Strategy for Urban Sustainability in Africa on the Basis of SDGs Interlinkage Analysis (Usia)", a research project for policy recommendation by JICA, was conducted by the UN University, the Institute for Global Environmental Strategies (IGES), University of Cape Town, University of Malawi, and University of Ghana. For Ghana, the researchers of UG who were involved in the SATREPS project participated in the research project and prepared a policy recommendation, "Strategies towards Sustainable Urban-Rural Interlinkages in Ghana", based on the research outputs of the SATREPS project. The outputs of the research project was widely released to the international society through the official side event of the 7th Tokyo International Conference on African Development (TICAD 7) held in March and August 2019, and led to use of the "Ghana Model" for international policies.

<Other Impacts at the time of Ex-post Evaluation>

There have been some positive impacts observed at the time of ex-post evaluation. The boreholes for communities provided by the

[2] ESDA was initiated in February 2009, by the United Nations University Institute for Sustainability and Peace (UNU-ISP). with the participation of 15 African and 15 Japanese and international scholars. Out of this conference came the idea of the ESDA Project – a project to establish Master's Programmes for sustainable development in Africa to be jointly managed by leading African universities with the support of UNU, UNESCO, UNEP, and UN-HABITAT, as well as Japanese and other universities outside Africa.

[3] The Belmont Forum is an international group of funding agencies and scientific organizations that are involved in support of global environmental change research, that aims to further accelerate and develop work in that field by mobilizing researchers and funding through international cooperation, in order to tackle the various challenges facing the sustainability of human society.

SATREPS project enabled to reduce time spent for fetching water in rural areas. They were also able to participate in training activities for the capacity building to eliminate gender gap as a result of gender analysis in the SATREPS project in order to enhance economic resilience of rural households. Moreover, collaborative research in the SATREPS project involving Japanese and Ghanan researchers was able to build the capacity of young researchers of Ghana and Japan and led to the submission of international research proposals. Also, a lecturer of UDS acquired Ph.D. on the research theme based on the SATREPS project at the United Nations University (UNU) in Japan.

No negative impact on natural environment was observed.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results	Source
(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.	Indicator 1 Educational policy and curriculum development at university level, which focus on climate and ecosystem changes	Status of the Achievement: not achieved (partially continued) (Project Completion) ● No education policy on climate and ecosystem changes at university level was elaborated. ● New programs for enhancing resilience were going to be developed at UG and UDS. (Ex-post Evaluation) The key research outputs haves been integrated into many aspects of the department curriculum: ➢ Climate change and ecosystems and GIS ➢ Disaster management and applied geomorphology, and so on	Terminal Evaluation Report Information provided by UG and UDS
	Indicator 2 Educational policy for engineers and observation capacity development for the Ghana Meteorological Agency	Status of the Achievement: partially achieved (not verified) (Project Completion) ● No education policy for engineer was elaborated. ● Through establishment of structure to operate forecasting methods and recognition of importance and usefulness of prediction and risk analysis based on satellite data and ground-based observation data, capacity development for G-Met was reinforced. ● The SATREPS project contributed to enhancement of the G-Met's observation capacity through the capacity development of weather forecast calculation by the Weather Research and Forecast (WRF) for the four staff members. (Ex-post Evaluation) No information available.	Terminal Evaluation Report , JST Final Research Report
	Indicator 3 Contribution to the ongoing policy formulation for climate adaptive capacity development by the Ghana Government	Status of the Achievement: partially achieved (partially continued) (Project Completion) ● One of the Ghanian members of the SATREPS project was a principal author of the "National Climate Change Adaptation Strategy" and contributed to the policy formulation process of the government of Ghana (Ex-post Evaluation) Refer to the Overall Goal.	Terminal Evaluation Report
(Envisaged Overall Goal) International environmental policies incorporating the Integrated Approach to Enhancing Resilience to Climate and Ecosystem Changes	Indicator 1 Policy recommendations shared in the science and technology community (e.g. Organization for Economic Co-operation and Development "OECD"/Global Science Forum "GSF") and presented to international panels and conventions such as United Nations Framework Convention on Climate Change (UNFCC), Convention on Biological Diversity (CBD), United Nations Commission on Sustainable Development (UNCSD), as well as platforms like Intergovernment Panel on Climate Change (IPCC), Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and CBD Secretariat.	(Ex-post Evaluation) Partially achieved. ● Although a number of policy briefs and recommendations were made during the project period and shared at TICAD VI (2016) and the Convention on Biological Diversity (CBD) - 13th Convention of the Parties (COP13) (2016) ● After the project completion, the results of the subsequent research projects of the SATREPS project which made further development of the "Ghana Model" was shared through the TICAD 7.	Information provided by UG and UDS, JST Follow-up Review report

3 Efficiency

The project cost and the project period were within the plan (the ratio against the plan: 88% and 100%, respectively). The outputs were produced as planned.

In the light above, the efficiency of the project is high.

4 Sustainability

<Policy Aspect>

At the time of the ex-post evaluation, there are policies in place which are in line with the direction of the outcome of the SATREPS research. "Nationally Determined Contribution under the Paris Agreement (NDC) (Updated)" (2020-2030) were set forth in September 2021 for enabling 47 countermeasures toward the NDC that includes continuation of rapid technology development as well as the transition to sustainable innovative technologies to meet country needs. In addition, the action plan in "the National Climate Change and Green Economy Learning Strategy" (2017) is actions to develop capacity for the implementation of NDCs starting in 2020 and its priority areas includes agriculture and food system.

<Institutional/Organizational Aspect>

Kazuhiko Takeuchi Centre for Sustainability and Resilience (KTCSR), which was established within the UDS campus in order to aim at sustainable development and the practical application of the "Ghana Model" for the society, is the center of inter-university collaboration in Ghana and is expected to facilitate research activities and human resource development. There are at least eight researchers and staff in KTCSR. In addition, the Center for Climate Change and Sustainability Studies (C3SS) was established in UG in 2017 and C3SS has promoted the research activities related to the SATREPS project and developed human resources through the master's and doctoral courses. However, it is not clear whether this platform has been used effectively as a forum for discussion.

<Technical Aspect>

UDS and UD have sustained the knowledge and skills in forecasting methods for climate and ecosystem change and water resources management by training to staffs and applying them to the other projects. Periodic trainings have been also provided as needed.

<Financial Aspect>

UDS, mainly KTCSR, has conducted the research activities related to the SATREPS project and conferred master's degree and Ph.D. It was confirmed that KTCSR has applied for research funding programs, including the European Region Action Scheme for the Mobility of University Students (ERASMUS) program[4] to obtain funds for the research activities and its operation. In UG, C3SS has continuously conducted the research and educational activities and the activities related to the SATREPS project have been continued at the time of ex-post evaluation. For G-Met, to secure funding for the partial software update associated with the global weather data system update is a challenge.

<Evaluation Result>

In light of the above, there has been an issue observed in terms of the financial aspect. Therefore, the sustainability of the effects through the project is fair.

5 Summary of the Evaluation

The project partially achieved the Project Purpose at aiming at the development of the "Ghana Model" for the integrated approach to enhance resilience to climate and ecosystem changes in Northern Ghana and achieved the Overall Goal to incorporate the "Ghana Model" into the international policies. As for sustainability, although there is a financial issue, the promotional policies against climate change have been advanced and there have been no obstacles in terms of organizational, institutional and technical aspects to continue the related research activities.

Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- Fragile equipment such as Data servers, elemental analyzer, AWSs, ARGs were provided by the SATREPS project and they were utilized at the time of ex-post evaluation. Periodical monitoring and management system are important to ensure that they remain in good conditions and are used for further research and activities.

Lessons Learned for JICA.

- For future project formulation of SATREPS project, the Project Purpose and the Overall Goal should be coherent with project activities. Especially, if the SATREPS project aims to impact to climate change/environment policy, involvement of policy levels such as Ministry in the project framework as well as actual activities should be considered. This project provides an illustrative example of how research findings were translated into policy. This was made possible by the involvement of the research team member in the formulation of policy. Also, it is essential to discuss how to share and reflect policy recommendations based on the research outputs by the SATREPS project among stakeholders including policy makers of the recipient county before completing the project.

[4] It is a program, which was implemented by EU from 2014 to 2020, to focus education, training, youth and sports

Kazuhiko Takeuchi Centre for Sustainability and Resilience (KTCSR), UDS, Nyankpala

Research equipment provided by the Project which have been still in use in University of Development Studies (Hitachi-Koki EH400D A6 & CELLSTAR PD-650)