Socialist Republic of Viet Nam

FY2019 Ex-Post Evaluation of Technical Cooperation Project

"Project for Development of the National Biodiversity Database System"

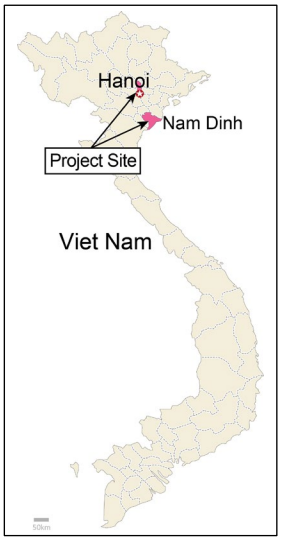
External Evaluator: Mitsue Mishima, OPMAC Corporation

0. Summary

The aim of the project was to develop the first generation National Biodiversity Database System (hereinafter referred to as "NBDS") by the end of the project, whose four outcome targets were: to establish a basic design of the database system; to propose a cooperation mechanism between related organizations; to construct a database in Nam Dinh Province; and to raise awareness of the operational capacity and utilization of NBDS, thereby developing the second-generation NBDS. The relevancy of the project is high, as the development of NBDS was in line with Viet Nam's development plans and policies at the time of project planning, as well as the needs of the executing agency and other related organizations for the preparation of information data on biodiversity conservation; it was also consistent with Japan's development assistance policy at the time. The development of the first generation NBDS was achieved by the end of the project and contributed to the capacity building of the implementing agency and the target organizations. However, because of the delay in responding to the bugs and improvement to NBDS after project completion, almost no activity was undertaken on the second-generation NBDS. Nevertheless, using NBDS data information contributed to the preparation of reports and research papers related to environmental impact assessment, such as the biodiversity conservation strategic plans, national reports, and management plans for Xuan Thuy National Park. It was also significant in promoting as one of policy actions for support program responding to climate change. Therefore, the effectiveness and impacts of the project are fair. The efficiency of the project is fair because although the project implementation period was within the plan, the project costs exceeded the plan. While the project is sustainable in policy aspect, there are some issues, that need to be improved in the government organization systems and the institutions for biodiversity conservation, and financial aspect. Thus, the sustainability of the project is fair.

In light of the above, this project is evaluated to be partially satisfactory.

1. Project Description



Project Site

Equipment supplied by Japan

(Left: Server, Upper right: PC, Lower right: survey equipment

1.1 Background

In response to the "2010 Target" adopted at the 6th Conference of the Parties of the Convention on Biological Diversity (hereinafter referred to as “CBD-COP6”) held in 2002, the Socialist Republic of Viet Nam (hereinafter referred to as “Viet Nam”) formulated the “National Biodiversity Action Plan 2010 and Vision to 2020 (Decision No.79/2007/QD-TTg)” in 2007. It also established the Biodiversity Law in 2008, aimed at conserving and developing biodiversity in land, sea, wetland, and farmland, realizing the sustainable use of biological resources, and strengthening the management of biosafety. Previous to this, Viet Nam had also ratified international biodiversity-related treaties such as the Ramsar Convention in 1989 and the Washington Convention in 1994, promoting biodiversity conservation.

The Ministry of Natural Resources and Environment (hereinafter referred to as “MONRE”), the implementing agency of the project, was stipulated to conduct the biodiversity management in an integrated manner, as provided by the *Act* (Article 6). MONRE plays a leading role in formulating a *national plan on conservation of biodiversity* (Article 10), conducting basic surveys for the monitoring of biodiversity (biodiversity basic surveys), building biodiversity databases, promoting their utilization, and reporting on biodiversity status.

For this reason, the Government of Viet Nam issued a request for technical assistance and cooperation from Japan for the development of a database system to consolidate and disclose data, based on systematic monitoring. The project then commenced with their counterpart (hereinafter referred to as “C/P”), the Biodiversity Conservation Agency (BCA) in the Viet Nam Environment Administration (VEA) of MONRE.

1.2 Project Outline

Super Goal		The second generation*of national biodiversity database system is developed.
Overall Goal		The second generation of national biodiversity database system is developed and piloted in selected protected areas and provinces.
Project Purpose		The first generation* of national biodiversity database system is developed.
Output	Output 1	[Establishment of Basic Design: Preparation of Master Scheme* and Architecture*] Architecture of NBDS is developed in VEA with the cooperation of MARD, MOST, VAST and other relevant agencies, institutes, etc.
	Output 2	[Recommendation for Cooperation Mechanism] Mechanism for collaboration with other agencies in sharing, managing, exploiting, and utilizing data and information of NBDS is recommended
	Output 3	[Establishment of Database of Nam Dinh Province] A database for Nam Dinh Province is developed as a part of NBDS.
	Output 4	[Management Capacity Development] Capacity on management and awareness of utilization of NBDS are strengthened.
Total cost (Japanese Side)		346 million yen
Period of Cooperation		November 2011 – March 2015
Target Area		Nationwide (Target of Data) Hanoi, Nam Dinh Province, Xuan Thuy National Park, Nam Dinh Province (Pilot Project)
Implementing Agency		Viet Nam Environment Administration (VEA) Ministry of Natural Resources and Environment (MONRE) * Under VEA, the Biodiversity Conservation Agency (BCA) is main organization for project implementation, with the involvement of Information Technology Center (ITC), Center for Environment Monitoring (CEM), Center for Environmental Information and Documentation (CEID)
Other Relevant Agencies / Organizations		● Institute of Ecology and Biological Resources (IEBR), Viet Nam Academy of Science and Technology (VAST), Ministry of Science and Technology (MOST) ● Ministry of Agriculture and Development (MARD) ● Department of Natural Resources and Environment (DONRE), Nam Dinh Province ● Xuan Thuy National Park (XTNP), Nam Dinh Province ● Department of Agriculture and Rural Development (DARD), Nam Dinh Province
Supporting Agency/Organizations in Japan		Ministry of Environment
Related Projects		[Technical Cooperation Projects] Project for Sustainable Natural Resource Management (SNRM) (Plan: August 2015 to August 2020) [ODA Loan Project] Support Program to Respond to Climate Change (SPRCC) (I)~(VII) (2010～2017)

*Glossary

The long-term vision of NBDS supported by the project, was to develop the first to third generation NBDS.

The first generation NBDS:
The function was to store and manage biodiversity information such as species information, survey/observation information, and metadata, etc. Data entry included the species data on the Red List, species data from Fauna and Flora Encyclopedia in Viet Nam, all survey data from Xuan Thuy National Park in the Nam Dinh Province, and the metadata of the existing database in Viet Nam. It was designed to be managed at the organizational/provincial level.

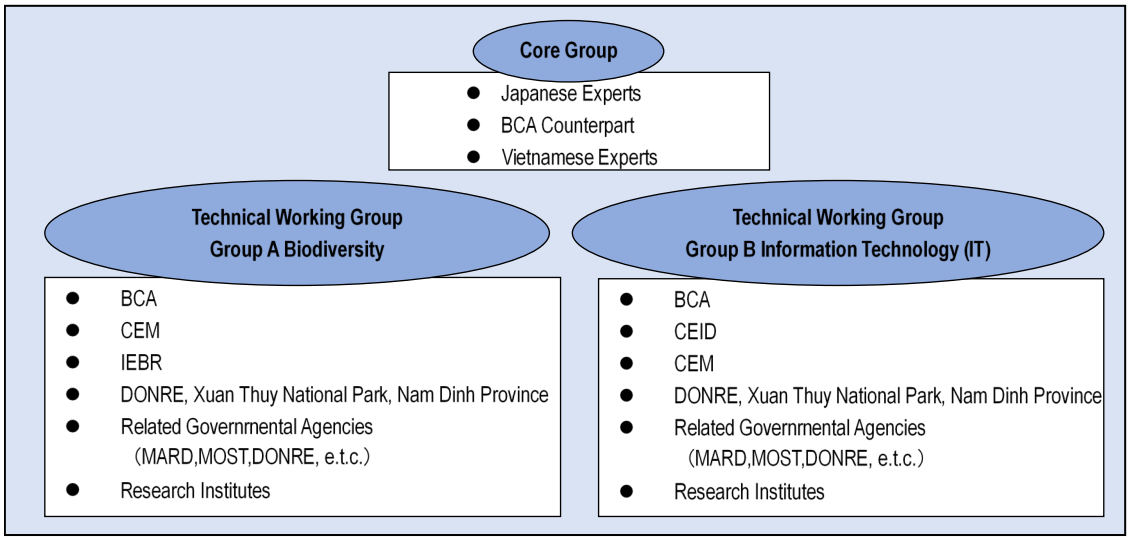
The second generation NBDS:
In addition to the functions and data of the first generation NBDS, this stores data on the biodiversity information in all provinces of Viet Nam. It has various data display functions (especially Web-GIS function) and shares the biodiversity information with related organizations.

The third generation NBDS:
In addition to the functions and data of the second-generation NBDS, this permits a data posting function by general individuals and a data linkage function with the biodiversity databases (according to GBIF standard) of every country in the world.

Master scheme:
A document submitted by the project implementing agency to a higher-ranking agency when conducting a large-scale project in a Vietnamese government agency. In this case, the contents include NBDS's basic policy, contents/structure, design, cooperation mechanism, operation and maintenance system, roadmap from the first generation to the third generation NBDS, required budget, staffing (man - month), etc.

Architecture:
A technical document that describes the logical and physical structure of NBDS as a computer system.

This project was implemented by forming a Core Group that prepared the five major output draft documents of project activities. Two technical working groups (Biodiversity and Information Technology) were also formed to review those draft documents (Figure 1 below).



Source: "Project for Development of the National Biodiversity Database System Project Completion Report (Summary)" June 2015, edited from Figure 1 in p.6

Figure 1:Working Groups for Project Implementation

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

This project was in line with the policies of Viet Nam and the needs of the main implementing agency, MONRE. It is highly likely that the project purpose will be achieved. The first generation NBDS was developed by the end of the project, contributing to the capacity development of not only the main C/P, BCA of MONRE VEA, but also of MONRE VEA's Information Technology Centre (ITC) and other related agencies who participated in surveys and other project activities.

1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation (Including other impacts)

The prospect of achieving the overall goal was dependent upon the implementation status of the Master Scheme on the Vietnamese side. Due to financial concerns, the possibility of achievement was evaluated to be fair. Despite this, the project activities had positive impacts in terms of effective cooperation with other projects and in the preparation of academic reports.

1.3.3 Recommendations from the Terminal Evaluation

[Recommendation to MONRE]

Recommendation	**Situation at the time of ex-post evaluation**
1. Secure budget for second-generation NBDS	Securing three-year budget for program implementation during 2019-2021 (partly)
2. Public relations activities to promote the use of NBDS	NBDS use promotion workshops and training courses were held in each region with protected areas as part of the subsequent technical cooperation “Sustainable Natural Resource Management Project” (planned period: August 2015 to August 2020).
3. Encourage the promotion of cooperation mechanisms in the central and provincial entities: involvement of central government-related organizations to mobilize the organizations of each local government (DARD and research institutes) and Provincial People's Committee (PPC), such as issuing cooperated circular on the establishment of a biodiversity agency in DONRE	Little has been done to build a mechanism for cooperation with organizations at the provincial level.
4. Effective collaboration with other related databases to avoid duplication: Collaboration with existing and other databases which are currently being created (e.g. FORMIS)	Collaboration with Global Biodiversity Information Facility (GBIF) has been realized. Collaboration with MARD's Development of Management Information System in Forestry Sector (hereinafter referred to as "FORMIS") has not been implemented.

[Recommendation to JICA]

Recommendation	Situation at the time of ex-post evaluation
As a pre-stage to disseminate the first generation NBDS to other provinces, in order to improve the quality of NBDS, support for MONRE to verify the effectiveness of the database for ecosystems different from the one targeted by this project.	It is implemented through technical cooperation “Sustainable Natural Resource Management Project” (August 2015 to August 2020).

2. Outline of the Evaluation Study

2.1 External Evaluator

Mitsue Mishima, OPMAC Corporation

2.2 Duration of Evaluation Study

The ex-post evaluation study was conducted with the following schedule:

Duration of the Study: October 2019 – August 2020

Duration of the Field Study: November 10 – December 6, 2019 and February 23 – March 6, 2020

2.3 Constraints during the Evaluation Study

During the implementation of this project, some IT staff who were responsible for the operation and maintenance of the data system and who had participated in the Technical Working Group in Information technology (IT), resigned or moved to other departments. This was also the case for most MARD and DONRE staff members who had participated in the Technical Working Group in Biodiversity. At the time of the ex-post evaluation, only a limited number of people could therefore be contacted and were interviewed.

3. Results of the Evaluation (Overall Rating: C[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Consistency with the Development Plan of Viet Nam

The project was consistent with the policies that were implemented since the time of the ex-ante evaluation until project implementation.

In response to the "2010 Target" adopted by CBD-COP6 in 2002, *the Biodiversity Law* was enacted in Viet Nam in 2008 (enforced in November 2009) and was aimed at conserving and developing biodiversity in land, sea, wetland and farmland, realizing the sustainable use of biological resources, and strengthening biosafety controls. Under the law, the BCA was to formulate a national plan for biodiversity conservation, conduct basic surveys for the monitoring of biodiversity, establish a biodiversity database, promote its utilization, and report on the status of biodiversity. In July 2013, the *National Biodiversity Strategy to 2020, Vision to 2030* was adopted as per the Prime Minister's decision, and four specific goals to 2020 were set. One of them was the creation of an inventory on biodiversity. The strategy also referred to "building a biodiversity database" as one of the seven programs of priority.

In addition, Viet Nam's *Five-Year Socio-Economic Development Plan 2006-2010* states that one of the main policies of the environmental conservation plan is "Ensure reasonable, effective,

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[2] ③: High, ②: Fair, ①: Low

and sustainable use of natural and environmental resources in watershed areas, ensure eco-balance and preserve biodiversity. Improve awareness of environment, paying attention to measures of pollution prevention and environmental improvement.”.

3.1.2 Consistency with the Development Needs of Viet Nam

This project met the development needs of Viet Nam for collecting data and information on biodiversity and for building a national database system.

In order for BCA to carry out the duties that were enacted under the Biodiversity Conservation Law, constructing a biodiversity database and enhancing its operation and maintenance capacity was necessary to provide information sources when preparing the biodiversity conservation strategy plan for Viet Nam. Thus, the contents of this project met the development needs of Viet Nam. There was also a need for other target group organizations involved in this project such as Xuan Thuy National Park, IEBR, etc. to enhance the capacity to collect and organize biodiversity data. In this context, it was also in line with staff needs of these target group organizations, to improve their survey and data collection capabilities.

3.1.3 Consistency with Japan’s ODA Policy

This project was consistent with Japan’s country assistance plan for Viet Nam, as evaluated when the detailed plan for this project was formulated.

At the time of ex-ante evaluation, Japan's Country Assistance Program for Viet Nam (July 2009) stipulated, as a priority, four main areas for assistance: 1) promotion of economic growth and strengthening of international competitiveness, 2) improvement of social and living aspects and rectifying disparities, 3) environmental conservation, and 4) strengthening governance. Under “ 3) environmental conservation”, the conservation of the natural environment included the conservation of biodiversity, and therefore the project was consistent with Japan's country assistance plan for Viet Nam.

This project was highly relevant to the country’s development plan and development needs, as well as Japan’s ODA policy. Therefore, its relevance is high.

3.2 Effectiveness and Impact[3] (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Achievement of Project Purpose

All outputs of the project, namely "1. Development of Basic design of NBDS", "2. Recommendation for cooperation mechanism of related organizations", "3. Development of Nam Dinh Province database" and "4. Improvement of capacity on management and awareness

[3] Sub-rating for Effectiveness is to be put with consideration of Impact.

of utilization of NBDS" were achieved based on the results of the terminal evaluation of the project, the project completion report (March 2015) and the field survey of the ex-post evaluation. Output 2, “2. Recommendation for cooperation mechanism of the related organizations”, was prepared as a MONRE draft Circular in the project final report was submitted to VEA as a legal document and was planned to be officially promulgated in 2015. However, as a result of the overview conducted by the Government of Viet Nam, a part of the recommendation “Regulations on provision, exchange and management of biodiversity information" developed by the project was promulgated reflecting on *Circular No.32/2018/TT Regulations on collection of natural resources and environmental data and information for storage, management, provision, exchange, and utilization of biodiversity information*. As for the cooperation system for exchanging information among MONRE, MARD and other related organizations to improve the utilization and convenience of NBDS, it was necessary to continue to make efforts to strengthen taking up more specific issues such as reflecting the data related to biodiversity owned by MARD in NBDS.

At the time of the ex-post evaluation, almost all the achievement indicators of the project’s purpose "Development of the first-generation national biodiversity database system" (see Table 1), were achieved. Japanese experts tested and confirmed that IT staff at that time could carry out the operation and maintenance of NBDS by the end of the project; despite this, there was no immediate action taken to make necessary improvements to NBDS with regards to malfunctions in its use and search methods that occurred after 2015, and the situation remained unchanged for some time. Since 2016, the update of data into NBDS from other protected areas, as part of the activities of the technical cooperation “Sustainable Natural Resource Management Project” (planned August 2015 to August 2020), was transferred to the server of the FIMO center under the jurisdiction of the National University of Viet Nam. From the end of 2018, CEID became responsible for the management of NBDS data, and most of the NBDS's problems were solved by the time of the field survey of the ex-post evaluation (February 2020) (Details about the malfunctions and issues to be improved are described in the "Impact" section below).

Table 1: Achievement of Project Purpose

Project Purpose	Target Indicator	Actual
The first generation of national biodiversity database system is developed.	1. NBDS Architecture is approved by VEA/MONRE.	Achieved at the time of terminal evaluation. The master scheme document and system architecture were developed and approved by the 4th JCC.
	2. Basic data on fauna and flora, at least all species on Viet Nam red list are input into NBDS.	Achieved at the time of terminal evaluation. As a result of the survey in Xuan Thuy National Park, all flora and fauna data on the Red List have been entered.

Project Purpose	Target Indicator	Actual
	3. 1st Generation of NBDS architecture is developed, operated and ,maintained in VEA/MONRE.	It is considered to have been achieved by the end of the project. Based on the master scheme and the system architecture documents, the first generation NBDS was developed and published on the web site. In addition, according to the project completion report and interviews with Japanese experts, it was confirmed that the IT staff of VEA of MONRE could carry out the operation and maintenance of NBDS at the end of the project in March 2015. However, at the time of the ex-post evaluation, the IT staff who were in charge at that time had already resigned or were transferred. The update of data into NBDS, as part of the activities of the technical cooperation "Sustainable Natural Resource Management Project" that started in 2015, was transferred to the server of the FIMO center of the National University of Viet Nam. The university compiled issues and made improvements to NBDS problems. From the end of 2018, CEID of MONRE VEA became responsible for dealing with these issues.

Source: "Socialist Republic of Viet Nam: Terminal evaluation report on Project for Development of the National Biodiversity Database System" (December, 2014), "Project for Development of the National Biodiversity Database System; Project Completion Report in Socialist Republic of Viet Nam (Summary)" (June 2015), and answer to the ex-post questionnaire and interview to stakeholders.

The terminal evaluation of the project analyzed that a contributing factor to achievement of project purpose and outputs is that Vietnamese experts, including university faculty members and research institutes, were assigned to the core group in the latter half of the project to carry out the work needed to produce the outputs. In addition, the assignment of an expert from those Vietnamese experts as a technical coordinator was analyzed to be a promoting factor to implementation of the project. Similar comments were made during interviews with Japanese experts at the time of the ex-post evaluation. Taking advantage of Vietnamese experts as this case was also considered to be very important to enhance the sustainability of the project effect after it was completed. Since there were many organizations involved in the project, including central and local government agencies, universities, and private organizations, it was necessary to have a technical coordinator who understand well the jurisdiction of those organizations and can promote communication and active involvement of each of these organizations. From the beginning of the project, it was indispensable to assign such Vietnamese experts in each target area and an expert who can have a role of facilitator among various organizations.

Based on the above, the indicators for development of the first generation NBDS were achieved by the end of the project, and it is considered that the project purpose was generally achieved.

3.2.1.2 Capacity Development of Implementing Agency and Related Organizations

In the project design, Output 4 called for the enhancement of the operation capacity and awareness of the utilization of NBDS by the implementing agency and related organizations. The achievement of indicators was based upon implementation results: namely, mainly IT survey and monitoring training related to IT and biodiversity, evaluation on participants by Japanese experts, and the preparation of manuals and the implementation of awareness workshops. The ex-post evaluation attempted to verify which points had improved the capacity of the implementing agency and related organizations, as a result of the training and workshops conducted as part of the project.

In interviews with Japanese experts, IT staff of the implementing agencies and related organizations (refer to "Column" in the below), for example, BCA and VEA, IT staff commented that they had learned how to build a database system through this project; Xuan Thuy National Park staff and VAST researchers also noted that they had acquired learning in data collection methods at the pilot site. Moreover. the data collection methods learned through this project are currently being used by Xuan Thuy National Park staff in formulating and monitoring the national park management plan. IEBR researchers also reported that they have applied this learning to their own research and others, utilizing learnings in their daily work.

(Column) Results of Interviews on Capacity Development to Implementing Agency and Related Organizations

Interviews were conducted with: 4 staff of BCA, 2 IT staff of VEA who participated in project activities (including one who was transferred to CEID as vice director), staff who participated in project activities, as well as those who knew about the work of those who participated in project activities of DONRE in the Nam Dinh Province, 2 staff members of Xuan Thuy National Park, and 4 researchers of IEBR. Opinions were collected from them throughout the project to determine (1) at which point they felt they had developed their capacity, (2) how they utilized learning and the knowledge obtained, and (3) whether they disseminated the knowledge to other staff. The main comments were as follows:

(BCA)

- Project participants have improved their capacity through workshops on biodiversity data collection and surveys, monitoring indicators, setting, and drafting of guidelines, and database construction and management. The database of the project was used as a reference for other project/programs of MONRE.
- The project enhanced the understanding on biodiversity data, investigation, monitoring and database system.
- Strengthen the linkage between Central government agency and local managers (sites/authorities, etc.).

(VEA IT personnel)

- Engaged in activities to plan NBDS architecture and learned a lot about data management knowledge, database development and construction. During implementation, the project supported learning for updating the data of Xuan Thuy National Park.
- During the training in Japan, I learned how to design a work plan (for system development).
- The knowledge learned through the project was passed on to other staff in the organization.
- After project completion, the operation and maintenance of NBDS was managed internally. When any problems emerged, countermeasures were taken for them. We improved the search function of NBDS by ourselves.

(Staff in charge of biodiversity Science and Technology Department, MARD)

- It was good in that the training in Japan deepened my understanding of the (information) system of biodiversity.
- I think communication between MARD and MONRE has improved after project implementation. The challenge is the lack of specific cooperation policies and mechanisms for data sharing. In addition to forest information of FORMIS, MARD owns fish data and genetic data, however there are no clear guidelines on how to share this information with MONRE.
- I have not seen the NBDS website after project completion.

(Xuan Thuy National Park)

- The data collected through the project provided an important database for national parks. After project implementation, the staff's capacity to conduct observations based on biodiversity conservation surveys and monitoring indicators improved. I learned about mangrove species, fruit trees, and bird species. Monitoring of mangrove conservation is also ongoing in cooperation with various external organizations. Also, we now consider the impact to climate change.
- After the training in Japan, the staff who mainly had knowledge of trees also learned about plant species. Before the project was implemented, there were only two technical staff who conducted biodiversity surveys, but after the project, the number of staff was increased to 10. As part of the training of new staff, knowledge on biodiversity and migratory birds was disseminated.
- Learning from the project was shared through meetings and workshops hosted by the government or NGOs. In particular, staff are now dispatched to the adjacent protected areas of Thai Binh Province to share the knowledge and experience gained through the project.
- NBDS data is used to prepare annual reports of national parks, reports of forest areas, and management plans.
- Data from Xuan Thuy National Park was also provided to researchers at universities inside the country. It was also provided to European and Australian researchers visiting the national park for field research, as well as Japanese university professors and students.

(DONRE)

- From the performance of staff who participated in the project at the time, I think they have gained more knowledge by participating in training, meetings, and surveys. Among the DONRE staff, no IT staff have been assigned to maintain the data system related to the project.

(IEBR)

- I participated in the project and exchanged knowledge and experience in cooperation with other Japanese and Vietnamese experts, and my capacity improved in terms of selecting databases, data structures, and monitoring indicators.
- In the study of biodiversity in Bach Long Vi, Thai Thuy district, Cham island biosphere reserve, etc., data collection was implemented by referring to the NBDS data structure and format. I would like to refer to other areas as well (eg. Bai Tu Long Bay).
- I instruct students who are currently registered in masters and doctorate courses and have introduced NBDS so that it can be applied to the research of these students.
- I drafted a research paper using NBDS and a report related to environmental impact assessment.
- I think the data of Xuan Thuy National Park related to the mangrove ecosystems can be applied to other wetland ecosystems, but further research is needed for that.

3.2.2 Impact

After project completion, malfunctions and improvements in the first-generation database system were pointed out. Thus, ex-post evaluation at first verified the situation of implementing countermeasures for them and examined the overall goal achievement prospects and other impacts. The target time for achieving the overall goal of the project was set at 5 years after the completion of the project, with the ex-post evaluation of the project to be implemented in 2020.

Therefore, the extent to which the overall goal was achieved was evaluated at the target time of the ex-post evaluation.

3.2.2.1 Status of the First Generation NBDS from project completion to Ex-post Evaluation

(1) Malfunction and Improvement of Data System

The operation and maintenance of the data system was to be managed by the person in charge of the IT center in VEA. However, after the project was completed, the transfer of project equipment (server, PC, survey equipment, etc.) to MONRE was not completed because there was some missing information[4] at the time. As described in Table 1, NBDS data was therefore transferred to the server of FIMO Center of the National University of Viet Nam. Data was then updated/added between 2015 to 2018, as an activity of technical cooperation, in the "Sustainable Natural Resource Management Project". During that time, the problems encountered using the first generation NBDS were reported by the professor in charge at FIMO Center in a paper in March 2017. From the end of 2018, CEID became responsible for the operation and maintenance of NBDS; they conducted a detailed problem analysis and worked on the following issues/improvements:

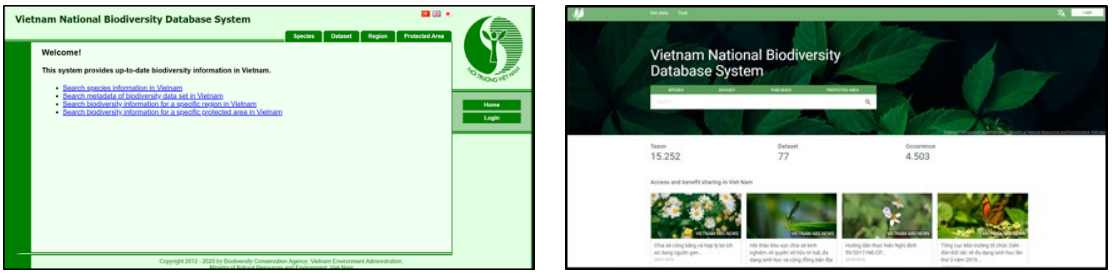
- ✓ Screen display interface: This was incompatible with the screen size of multiple devices (such as smartphones besides PC), and the screen display did not perform well.
- ✓ Software management: New user information for login could not be registered. The website could not be logged in and the user could not manage the account information themselves.
- ✓ Data search and display: There were some parts that could not be displayed well when conducting data searches.
- ✓ Online Map: There was no geographical information of national parks or protected areas.
- ✓ Detailed data display: It was difficult to search and display data by species, datasets, publishers, and protected areas.

These were the main bugs that were identified while using NBDS, and the points that needed to be improved in order to enhance its utilization and convenience after the project ended. The login problems identified above persisted, and the staff of Xuan Thuy National Park pointed out that they could not update the data nor download data/information in NBDS. At the end of 2018, following the analysis for issues to be improved, CEID contracted a private company and started to repair the database system. At the time of the ex-post evaluation survey, repair for malfunctions and improvements were completed, with the exception of the integration of

[4] According to BCA, original invoices are necessary in order to arrange for transfer of equipment. In this case, only copies were obtained. Even at the time of the ex-post evaluation (April 2020), the procedure for transfer of equipment had not been initiated.

unification of classification guidelines. The new login system was being constructed and login information was being entered again. CEID managed the login information and became responsible for updating the data.

At the time of the ex-post evaluation, the NBDS website which was created at the time of the project (http://nbds.vea.gov.vn/) and the design improved version (http://nbds.ceid.gov.vn/) had both been published on the web, and were available to general users (see Figure 2~~1~~). However, CEID has confirmed that only their website will be released in the future.



WEB Site prepared by the project　　Web site updated by CEID

Figure 2: NBDS Web Site (As of March)

(2) Quality of data/information content

In the Project Completion Report (June 2015), there were concerns about how to guarantee the quality of the data stored in the NBDS as a national level database. Ideally, the BCA should be responsible for quality assurance; however, expert staff would need to be assigned for this, which was difficult to do. Thus, a more realistic solution was to have the quality assurance responsibility be pursued by the information provider. Therefore, it was stated that it was necessary to establish the NBDS usage rule guidelines for this purpose.

Even at the time of the ex-post evaluation, feedback received on the first generation NBDS published on the website included: IEBR “Classification codes are not unified", "collected data is old and there is information that is hard to say that it is a survey result according to an appropriate survey method" and "a draft stage data set is also included." This opinion was highlighted by the implementing agency (BCA), related organization (CEID, IEBR), and general users[5].

The data and information from Xuan Thuy National Park was initially collected and updated from the primary data in the project. The data was then updated again by the subsequent technical cooperation "Natural Resource Management Project", when IEBR researchers reviewed the quality and then also conducted data input. At the end of this project, which is

[5] Hearing was conducted to representative of Vietnamese NGO in Environment sector GIZ consultant, university professors, and so on.

scheduled to be completed in 2020, BCA must take the initiative and establish a policy for quality assurance of data and information.

(3) Promotion of NBDS to the Public

Due to insufficient awareness of NBDS during the implementation of this project, enhancement of NBDS's public relations activities were recommended to MONRE in the terminal evaluation. This was included as part of the technical cooperation activities conducted in the “Sustainable Natural Resource Management Project”, that has been implemented since August 2015. At the time of the ex-post evaluation (February 2020), more than 30 local provincial environment bureaus and protected area employees were involved in workshops to introduce, disseminate, and promote the use of NBDS. Thus, the awareness of NBDS among the participating DONRE staff and staff in charge of protected areas has improved and is spreading.

3.2.2.2 Achievement of Overall Goal

At the time of the ex-post evaluation, almost all the malfunctions and improvements of the first generation NBDS had just been completed; however, most of the activities of the overall goal "Development and trial of the second-generation NBDS in specific protected areas/provinces" had not yet been undertaken. In definition of the second-generation NBDS (refer to the explanation of terms on p.5), as mentioned before the addition of new data from other protected areas was being carried out as part of the activities of the technical cooperation “Sustainable Natural Resource Management Project”. However, the development work of the second-generation NBDS, which additionally had the function of Web-GIS and the sharing of biodiversity information of each related organization, had not yet been initiated.

Therefore, as indicated in Table 2, the overall goal indicators 1 and 2 were not achieved. With regards to Indicator 1, initially the staff of Xuan Thuy National Park could not update the data on NBDS due to a malfunction of the NBDS system; the data collected through the project was later updated and continued to be monitored, and was utilized for park management monitoring plans. In addition, according to the representative of DONRE in Nam Dinh Province, the Department referred to the information collected by the project from the Xuan Thuy National Park and formulated “Report on Planning for Biodiversity Conservation in Nam Dinh Province to 2020, with vision to 2030" (2018) and it was approved by the provincial government. Moreover, the Nam Dinh Province People's Committee announced the biodiversity zoning plan in early 2019, and this is scheduled to be implemented from 2020. NBDS data will provide key information to be used for zoning and DONRE will supervise the zoning.

As for Indicator 3, the NBDS was used by the BCA to prepare “The Sixth National Report to the United Nations Convention on Biological Diversity”. In addition, NBDS data was also

referenced in the Viet Nam National Biodiversity Strategy up to 2040, which was being revised at the time of the ex-post evaluation.

Table 2: Achievement of the Overall Goal

Overall Goal	Indicator	Actual
The second-generation of national biodiversity database system is developed and piloted in selected protected areas and provinces.	1. Utilization method of NBDS for management purpose is developed in Nam Dinh Province.	Not Achieved This indicator was not achieved because the second generation NBDS was not developed. Nevertheless, it should be noted that the indicator "the utilization of NBDS for management purposes is developed in Nam Dinh Province " is unclear about what is specifically meant by “development of utilization method of NBDS". In the sense that “use of NBDS is promoted for management purposes”, the ex-post evaluation survey of Xuan Thuy National Park in Nam Dinh Province confirmed that updating and use of data and information input to NBDS is being promoted. Interviews with Xuan Thuy National Park and the Biodiversity Division of Nam Dinh DONRE indicated that the first generation NBDS was not accessible by them. It was necessary to login to NBDS to update the data and, initially, they were unable to log in, and this persisted for some time. However, as mentioned above, Xuan Thuy National Park staff updated data and information on flora and fauna collected for the project by themselves, and utilized them for management and monitoring plans, as well as the annual report of the national park. In addition, the Biodiversity Division of Nam Dinh DONRE also established a provincial biodiversity conservation strategic plan prior to other provinces, using NBDS information and data.
	2. The GIS-linked NBDS is used for selected protected areas and provinces in a province other than Nam Dinh.	Not Achieved The second-generation NBDS refers to collaboration with GIS, but since such a system had not yet been developed, it had not been utilized.
	3. NBDS is used for preparation of biodiversity-related national reports.	Achieved NBDS had been utilized to draft a national level report "The Sixth National Report to the United Nations Convention on Biological Diversity".

Source: Source: “Socialist Republic of Viet Nam: Terminal evaluation report on Project for Development of the National Biodiversity Database System” (December, 2014), “Viet Nam: Project for Development of the National Biodiversity Database System: Project Completion Report (Summary)” (June, 2015) and answer to the ex-post questionnaire and interview to stakeholders.

There were two reasons why the overall goal of the project had not been achieved at this point. The first was concerned with the function of sharing biodiversity information with related organizations towards the establishment of the second-generation NBDS: although a legal document was formulated for cooperation with related organizations, concrete efforts for sharing information had not progressed much after completion of the project. Forming a platform for securing data quality and exchange of opinions, which BCA took the initiative to do after the implementation of the project (for example, by establishing a discussion platform which consisted of MARD, biodiversity conservation researchers, and related institutions in the target area, etc.), had not been consciously established in the work group activities during

project implementation. In fact, insufficient active participation of MARD and other related organizations was stated in the project completion report (June 2015) as an issue and lesson for implementation. Considering the different jurisdiction of each organization (each organization's responsibilities and future issues is described in “3.4 Sustainability and 3.4.3 Institutional /Organizational Aspects for the Sustainability of Project Effects”), it was deemed that such efforts were important from a long-term perspective in order to achieve the overall goal and to ensure sustainability,

The second reason was the delay in responding to malfunctions and the improvements needed in the first-generation NBDS. It would have been better if the project aimed to build a more sustainable operation and maintenance system, including outsourcing of this work during project implementation. As mentioned earlier, support for updating the data was done as part of a subsequent project with MARD as the main counterpart, with CEID being assigned responsibility for operation and maintenance.

As mentioned above, the malfunctions of the first generation NBDS have only now been repaired and the display visuals improved; the activities toward the system development of the second-generation NBDS were almost not initiated, and therefore the overall goal has not been achieved.

3.2.2.3 Other Positive and Negative Impacts

Other impacts of the project were as follows:

(1) Dissemination of knowledge on survey and data collection methods in Xuan Thuy National Park.

As a result of interviews with IEBR researchers and Xuan Thuy National Park staff at the time of the ex-post evaluation, the data collection methods and other knowledge learned through the project was disseminated to colleagues, younger staff, new staff, and masters and doctorate students taught by IEBR researchers (refer to "Column" above).

Xuan Thuy National Park

(2) Contribution to the preparation of reports such as EIA that refer to the current status of biodiversity and protection policies.

At the terminal evaluation, it was reported that NBDS information was used for the EIA of the shellfish farming industry. At the time of the ex-post evaluation, IEBR researchers confirmed that there were a total of six reports related to environmental impact assessment that

were prepared using NBDS data, as shown in the table below. The NBDS also contributed to the preparation of a report on the current situation on biodiversity and conservation policy.

Table 3: Reports related to EIA using NBDS Data

Year	Title	Funded by
2011-2014	Assessment of threatened species of wild animals and plants for revision of the Red Data Book of Viet Nam.	Ministry of Science and Technology (MOST) of Viet Nam
2012-2014	Assessment of biodiversity of deciduous and broad-leaf evergreen forests in the Central Highlands and conservation measures (TN3/T07).	
2014-2015	Additional survey and develop a database system for biological resources of Bach Long Vi Island, Hai Phong city	Viet Nam Academy of Science and Technology (VAST) and Hai Phong DONRE
2015–2018	Research on the fish fauna of northwestern Viet Nam	The Government of Viet Nam
2016-2018	Scientific arguments to harmonize the relationship between biodiversity conservation with sustainable livelihoods and economic development - society in the biosphere reserve Cu Lao Cham - Hoi An	Ministry of Science and Technology of Viet Nam
2018-2020	The NEF Bio-ecological Nature Conservation Project in Mountainous Region of North Viet Nam	Nagao Natural Environment Foundation (NEF) of Japan

Source: Documents provided by IEBR

(3) Contribution in the Field of Biodiversity to Academic Survey and Research Activities, Information Sharing, International Cooperation

According to IEBR researchers, even after the completion of the project, research papers were being drafted by referring to data in the NBDS itself or the method of collecting data information as part of the project activities. IEBR reported that there were 13 papers (Table 4) that used the NBDS data from the time of project implementation to the ex-post evaluation. In addition, one doctoral research paper by a BCA staff member also used the data of Xuan Thuy National Park in NBDS. According to the staff of Xuan Thuy National Park, based on the data and information stored in NBDS, the "Current Status of Biodiversity of Xuan Thuy National Park" (2015) was compiled; this was funded by the United Nations Development Program (UNDP) and Global Environment Facility (GEF). The data on the results of the project was also shared, upon request, with overseas universities that visited for field research since the project completion, and this was referenced as part of their research papers.

Table 4: Research Papers Prepared using NBDS Data

Year	Title	Journal / Academic Society
2013	Study on main plant communities, taxonomy component and proposal of the potential biodiversity indicators in Xuan Thuy National park.	Proceeding of the 5th National scientific conference on ecology and biological resources, Agricultural Publishing House, Hanoi, Viet Nam.
	Species composition and distribution of macrobenthos in Xuan Thuy National Park, Nam Dinh province	
	Species diversity of fishes in Ba Lat estuary and Xuan Thuy National Park	
	Ecosystems mapping of Xuan Thuy National Park	

Year	Title	Journal / Academic Society
2014	New records of reptiles from northern Viet Nam	Abhandlungen des aturwissenschaftlichenVereinszu Bremen
2014	Variation of soil, water quality and impacts on biodiversity in Xuan Thuy Ramsar site	ARPN Journal of Agricultural and Biological Science
2014	Constructing biodiversity indicators for monitoring wetland ecosystem in XTNP	National scientific conference on Ecology and biological resources, Agricultural Publishing House, Hanoi, Viet Nam
	Biodiversity at XTNP	
	Fish diversity in Ba Lat estuary and XTNP	
2014	PhD candidate educated by IEBR on topic of Biodiversity Indicator Development	Central Institute for Natural Resources and Environmental Studies (CRES) Viet Nam National University (VNU)
2014	Relationship of macroinvertebrate species and mangrove species in Xuan Thuy National Park, Viet Nam	Journal of Vietnamese Environment
2014	Composing biodiversity indicators for the conservation of mangrove ecosystem in Xuan Thuy National Park, Viet Nam	Journal of Vietnamese Environment
2019	Sample checklist of Gastropoda and Bivalvia in Cham Islands, Viet Nam	Biodiversity Data Journal

Source: Documents provided by BCA and IEBR

Interviews were also conducted with some university professors, namely Prof. Vo Thanh Son of the Central Research Institute for Natural Resources and Environment Studies (CRES) of Viet Nam National University, who participated in the Technical Working Group of Guidelines for Monitoring Biodiversity Indicators, and Professor Nguyen Lan Hung Son, Hanoi University of Education, who was involved in the activities of the pilot project in the Xuan Thuy National Park. Contrary to what was highlighted above, both professors commented that they had never seen nor used the NBDS after project completion. The reason given was that the data and information was old. Both professors were not aware that NBDS had updated data inputted from other protected areas, even after project completion. In the future, it will be necessary to improve the convenience by continuing to exchange information and opinions with such domestic university researchers, while updating and reviewing the NBDS data and information.

It is important to note that there was no support from other donors towards NBDS-related development and promotion from the time of the end of this project to the ex-post evaluation.

(4) Impact and Synergy Effects of Climate Change Program Loans

The direct financing effects cannot be confirmed as the program loan was not directly allocated to the BCA budget. However, according to the BCA, the Japanese ODA loan for the "Support Program to Respond to Climate Change" (herein after referred to as "SP-RCC") became more active, which in turn led to the development of BCA activities. The BCA has constantly reported about project activities at SP-RCC meetings, and the BCA's activity plan was endorsed by SP-RCC, which created an opportunity to develop BCA's biodiversity conservation activities. Biodiversity conservation strategic plans were formulated based on the

biodiversity data prepared in the project; these were significant to promote policy actions for countermeasures for climate change.[6]

At the project completion, the project purpose was mostly achieved; however, since it took time to respond to the malfunctions of the first generation NBDS after that, the NBDS upgrading activities towards the overall goal of the second-generation NBDS were only described in master plans. These were just formulated as a plan, and the activities described in the master plan had mostly not yet started. On the other hand, the data of NBDS from Xuan Thuy National Park, which was the target of the pilot project, was used for national and provincial biodiversity conservation planning and policy making. The impact of the project was acknowledged as a part of data was utilized by researchers for their research papers and studies.

As described in the above, since this project has to some extent achieved the project purpose and overall goal, effectiveness and impact of the project are fair.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

The table below shows the actual results at the time of project completion compared to the detailed plans formulated during study of the project.

Table 5: Inputs for the Project

Inputs	Plan	Actual (at the time of project completion)
(1) Experts	4 Short term experts (Chief Advisors. Biodiversity monitoring, Database development, Coordinator) (No information about M/M)	13 Short term experts (Chief Advisors. Biodiversity: Fauna, Biodiversity: Flora, Data base development Database development assistant, Coordinator) (Total Approximately 72.69M/M)
(2) Trainees received	3 persons yearly	23 persons (Training in Japan: 17 persons and training in Malaysia 6 persons)
(3) Equipment	Server, database, software, workstation, PC, color laser printer, scanner, etc.	Server, database, software, PC, printer, and other office supply, survey equipment
(4) Japanese Side Total Project Cost	316 million JPY	347 million JPY
Vietnamese Side Total Project Cost	No figure at the time of plan	Total 57,000 USD (As of the time of terminal evaluation in December 2014)

Source: "Socialist Republic of Viet Nam, Detailed Planning Survey Project for Development of the National Biodiversity Database System" (February 2011), "Socialist Republic of Viet Nam: Terminal evaluation report on Project for Development of the National Biodiversity Database System" (December 2014)

[6] The development of NBDS supported by the project was set as one of the policy actions of SP-RCC. The progress of policy actions is confirmed every year at the forums of policy dialogues with development partners and the results are reported to the National Climate Change Committee, which is chaired by the Prime Minister and is the final decision-making body for climate change countermeasures.

3.3.2 Elements of Inputs

Regarding the dispatch of experts, four persons were initially planned and assigned, namely a chief advisor, a staff member for biodiversity monitoring, database development, and a coordinator. However, the number of database specialists deployed increased due to the addition of database assistants in the first year, and the addition of individual specialists in the fields of flora and fauna for biodiversity monitoring. There was also a Vietnamese expert from the International Union for Conservation of Nature (IUCN) specializing in wetlands for biodiversity assigned as part of the group. In terms of the quality of these experts' inputs, when interviewed by the implementing agency and related organizations, they evaluated that they were generally satisfied with their performance.

As for the number of trainees received, the total number of trainees increased from the initial plan of about 3 persons per year to 23 persons in total. These included technical working group members from BCA and other related organizations. Participants rated the training as generally satisfactory.

3.3.3 Project Cost

The amount of funding from Japan for the project was stated as 316 million Yen in the initial plan; actual funding was 347 million Yen (109% of the plan), thus exceeding the plan. Project cost exceeded the plan due to the number of additional experts dispatched and the increase in the number of trainees.

3.3.4 Project period

The project period in the initial plan was meant to be from March 2011 to August 2014 (3 years and 6 months); the actual project started a bit later but remained within the plan, from November 2011 to March 2015 (3 years and 5 months - 95% of the plan).

From the above, although the project period was within the plan, the project cost exceeded the plan. Therefore, the efficiency of the project is fair.

3.4 Sustainability (Rating: ②)

3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

After project completion, a number of Vietnamese policies were issued that emphasized biodiversity conservation, thereby enhancing the probability of continuing to improve, operate and properly maintain the NBDS, as this was necessary to understand and monitor the current situation.

First, the *Intended National Determined Contribution (INDC)* (September 2015) addressed the commitment of the international community towards the reduction of greenhouse gas emission.

It highlighted the need to make efforts in biodiversity conservation in relation to improving livelihoods of communities and generating income.

The Prime Minister's Decision on the National Natural Resources and Environmental Monitoring Plan was promulgated on January 12, 2016 [7], and national monitoring points were designated in areas such as meteorology, water resources, and environmental conservation. As part of this decision, 44 protected areas were designated for biodiversity monitoring. For this reason, it was critical to improve the database system and to carry out appropriate operation and maintenance. The ongoing technical cooperation *Sustainable Natural Resource Management Project* supported collection of biodiversity-related data for the 44 protected areas and data input for NBDS and, as of the end of 2019, data update from 32 of these protected areas had been completed.

BCA plans to develop the second-generation NBDS in the three years from 2019 to 2021 as part of the *Program for Monitoring & Evaluation to build Biodiversity Database 2019*. At the time of the ex-post evaluation, a master scheme for the program was being prepared, which will be approved by MONRE during 2020.

In addition, BCA participates in GBIF, which shares biodiversity information with the international community, and NBDS is required to provide GBIF with reliable data in line with international standards. Thus, BCA must ensure the quality of data will continue to be undertaken in a more deliberate and intentional way.

3.4.2 Technology required to sustain the effects

In reference to the technical aspects, continuous improvement and development of the database system was started at the time of the ex-post evaluation, and will be maintained to some extent in the future.

(1) Capacity to formulate biodiversity data collection and monitoring policies for NBDS (BCA)

Through the experience of working with researchers on the data of nearly 40 protected areas nationwide in the technical cooperation “Sustainable Natural Resource Management Project”, BCA became aware of which procedures should be implemented for reviewing data. Based on this work, data collection and monitoring policies for each region can be formulated in the future.

(2) Operation and maintenance of database system (CEID)

CEID, which was responsible for the maintenance of the database system, has a system in place to outsource to an external private company the malfunctions and improvements needed in the

[7] Decision No. 90/QD-TTg, Approval for a master plan for national natural resources and environment monitoring networks for 2016-2026, with a vision to 2030

database system. As a result of this, since 2018, the database system has been improving gradually. In addition, at the time of the ex-post evaluation, CEID's Vice Director had participated in the technical working group of the project from the start as an IT person, and so was familiar with NBDS. Thus, he is able to supervise the quality of the work done by the private company when contracting them for correction of malfunctions of the data system.

(3) Xuan Thuy National Park, Nam Dinh Province

Regarding the update of databases in Nam Dinh Province, the staff of the Xuan Thuy National Park who had previously conducted mangrove monitoring, now disseminated to their knowledge to new staff, about leanings of the distinction of plant species that they had acquired through the project, as well as biodiversity data collection methods. The project produced "Guidelines for the development and use of biodiversity indicators" and "Technical guidelines for survey methods and monitoring of coastal wetlands" which was used for the pilot project. With reference to these guidelines, Xuan Thuy staff can conduct continuous monitoring and update of the data.

3.4.3 Institutional /Organizational Aspects for the Sustainability of Project Effects

There are institutional constraints on biodiversity conservation, including that it can take a long time to establish a cooperation system with each related organization. However, the organizational structure of BCA, CEID and Xuan Thuy National Park that was supported by the pilot projects is expected to be maintained to some extent for sustainability of NBDS

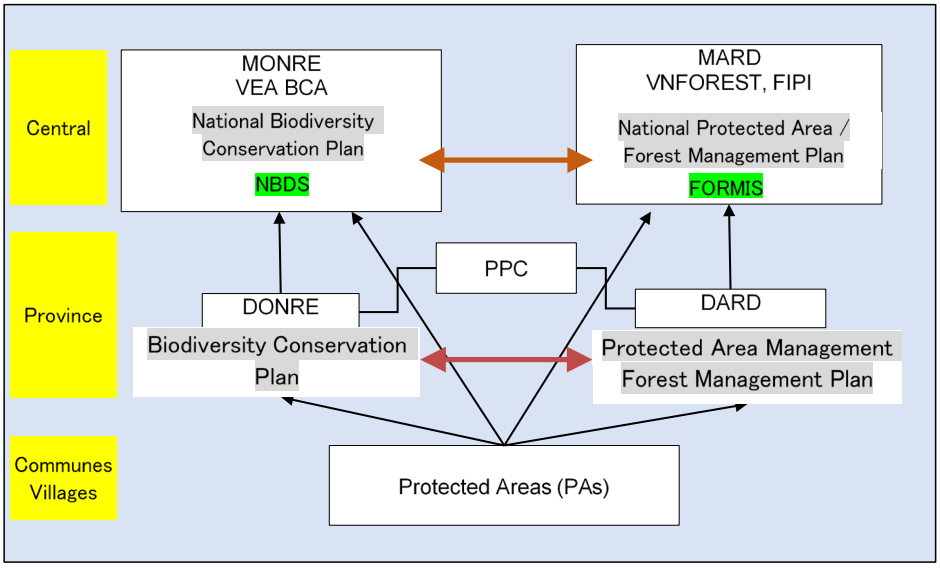
(1) Institutions on Biodiversity conservation and cooperation System with related organizations

Considering that the NBDS aimed to build a data/information system that contributed to biodiversity conservation, information on protected areas which are a living environment for fauna, flora, genetic information, etc. was also very important. Data and information on forests and genes fall under the jurisdiction of MARD, with forests specifically falling under FORMIS of MARD.

BCA formulates biodiversity conservation strategies at the national level, DONRE is responsible for conservation strategies and plans at the provincial level. Conservation of protected areas include biodiversity conservation. MARD directly supervises the protected areas if they extend over multiple provinces, but if the protected areas are located within one province, they are supervised by the Provincial People's Committee (PPC) of each province. Therefore, the protected area’s conservation plan is formulated by each protected area, which is then submitted to MARD if it is under the direct control of MARD, or to DARD if it is under the responsibility of the province, with DARD conducting the monitoring and conservation of each

protected area of the Provincial People's Committee. Therefore, central, and local related organizations are complicatedly involved (see Figure 2). Furthermore, there are various types of protected areas, such as wetlands, forest type areas, limestone areas, etc. and each will answer to different related ministries and agencies.

In this way, jurisdiction over information related to biodiversity conservation and implementation of conservation are quite complicated in Viet Nam. Another complication is that MONRE conducts their work based on biodiversity law whereas MARD conducts their work based on forestry law. In some cases, the demarcation of authority is unclear and overlap, thus the conservation plans of each related organization need to be coordinated with each other so that they are consistent. This institutional complexity causes great difficulty in implementing data and information sharing in cooperation.



FIPI: Forest Inventory and Planning Institute, Ministry of Agriculture and Rural Development

Figure 3:Relationship between Central and Provincial-level Institutions on Biodiversity Conservation

Through the project, a framework for cooperation with related organizations was proposed. In 2016, a memorandum of understanding was signed between VEA of MONRE and Viet Nam Administration of Forestry (VNFOREST) of MARD (MOU), on sharing data and information on the conservation of nature and biodiversity, thereby taking a step towards cooperation. However, in the future, it will be necessary to seek more specific ways of efficient data and information sharing in NBDS, and to continue to work on this.

(2) BCA

At the time of the ex-post evaluation, the person responsible for the operation and management of the NBDS was the deputy director of BCA along with two staff members, for a total of three personnel. After project completion, with the cooperation of BCA and IEBR researchers and an IT professor at the National University of Viet Nam, BCA had conducted a quality review activity to collect and update data of about 40 protected areas, as part of the technical cooperation "Sustainable Natural Resource Management Project". After the end of the project, it was necessary for BCA to take the initiative to review and update the database; in the future it will be necessary to mobilize personnel with the cooperation of the researchers, and to designate the time and budget required for this. Given the current status of the BCA system, it is predicted that it may be difficult to implement the project on the same scale after the completion of the project, but that it will gradually advance within the range of the budget that can be secured.

(3) CEID

There are four staff members in the CEID Technical Development and Application Department and one staff member in the Environmental Information Department who are responsible for the operation and maintenance of the NBDS. The staffing system seems to be sufficient, with no particular problems to note.

(4) Xuan Thuy National Park and DONRE in Nam Dinh Province

The number of staff in Xuan Thuy National Park was increased to 10 or more, and the personnel system was enhanced. At the time of the terminal evaluation, information circulars stated that a new division specialized in biodiversity was being set up within each province's DONRE. However, at the time of the ex-post evaluation, such a specialized department had not yet been established in Nam Dinh Province. NBDS data information management/update work at the provincial level seems to be manageable if the staff in each protected area are able to access and update the data without relying on dedicated personnel in charge of data update in DONRE.

3.4.4 Finance required to sustain the effects

In regard to financial sustainability, the repair and improvement of NBDS malfunctions after the end of 2018 were implemented through the CEID budget and so is expected to be sustainable to some extent due to the data system operation and maintenance budget. On the other hand, the financial sustainability of the BCA-planned update of data collection seems to be constrained due to the following points:

(1) Collect biodiversity data and implement monitoring activities

BCA had formulated a budget plan of 14.65 billion VND (about 70 million yen) for three years towards the "Program for Monitoring & Evaluation to build a Biodiversity Database 2019". BCA was developing a master plan for biodiversity data collection (currently in draft stage, to be approved by the Ministry in 2020) to promote the second-generation NBDS, which held actual data from each protected area. BCA planned to review biodiversity indicators and collection methods, and to work towards the construction of the second-generation NBDS. While the budget for the first year was 500 million VND (Vietnamese Dong), 1 billion VND was actually executed, thus securing more than the planned budget for that year. However, as of February 2020, it was confirmed that while the budget for the second year was 10.5 billion VND, the actual budget allocated was only 1.5 billion VND (about 14% of the planned budget). At the time of the ex-post evaluation, only part of the planned activities could be implemented and financial sustainability was partial.

(2) NBDS operation and maintenance costs

Between 2014-2018, BCA has allocated an average budget of approximately 100 million VND (approximately 500,000 yen) towards NBDS operation and maintenance costs every year. This amount was not enough to secure the repair and improvement of database malfunctions. Since the end of 2018, NBDS has been operated and maintained by CEID and the database has been repaired by outsourcing it to an external private company; a budget of 500 million VND (about 2.3 million yen) was allocated for this. In the 2020 fiscal year, a budget of 300 million VND (about 1.4 million yen) will be secured to improve the database system equivalent to the second-generation NBDS.

(3) Xuan Thuy National Park, Nam Dinh Province

In Nam Dinh Province, an outside expert was never hired to monitor and update the database as it had been set in the original plan, and it was left to Xuan Thuy National Park staff to conduct mangrove monitoring to the extent possible. The monitoring and management budget of Xuan Thuy National Park is based on the budget of the provincial government, which is the decision of the Provincial People's Committee in the future. According to DONRE in Nam Dinh Province, the total budget for implementation of environmental policy including air pollution and water quality management, is about 1% of the total budget of the province, of which the budget for biodiversity conservation is very limited. At this point in time, there is no certainty regarding securing a budget in the future.

(4) Other protected areas

As for the protected areas within each province (not including those that fall under the direct control of MARD), it seems that the situation is similar to that of Nam Dinh Province, in that each province also has a limited budget for the environmental sector. There are insufficient funds to carry out data collection and monitoring activities based on indicators of biodiversity conservation, as funding comes from the provincial government budget, unless external financial support (donor support funds, research institute survey, etc.) is secured.

3.4.5 Operation and maintenance status of equipment provided

The current status of servers in MONRE's Information Technology Center (ITC) and PCs, software, printers, survey equipment, etc., in BCA was confirmed and it was found that there were no particular problems with the equipment. It was also confirmed that a series of manuals prepared by the project are also in the BCA and can be referred to when necessary.

As in the above, some problems have been observed in terms of the institutional/organizational and financial aspects. Therefore, sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The aim of the project was to develop the first generation NBDS by the end of the project, whose four outcome targets were: to establish a basic design of the database system; to propose a cooperation mechanism between related organizations; to construct a database in Nam Dinh Province; and to raise awareness of the operational capacity and utilization of NBDS, thereby developing the second-generation NBDS. The relevancy of the project is high, as the development of NBDS was in line with Viet Nam's development plans and policies at the time of project planning, as well as the needs of the executing agency and other related organizations for the preparation of information data on biodiversity conservation; it was also consistent with Japan's development assistance policy at the time. The development of the first generation NBDS was achieved by the end of the project and contributed to the capacity building of the implementing agency and the target organizations. However, because of the delay in responding to the bugs and improvement to NBDS after project completion, almost no activity was undertaken on the second-generation NBDS. Nevertheless, using NBDS data information contributed to the preparation of reports and research papers related to environmental impact assessment, such as the biodiversity conservation strategic plans, national reports, and management plans for Xuan Thuy National Park. It was also significant in promoting as one of policy actions for support program responding to climate change. Therefore, the effectiveness and impacts of the project are fair. The efficiency of the project is fair because although the project implementation period was within the plan, the

project costs exceeded the plan. While the project is sustainable in policy aspect, there are some issues, that need to be improved in the government organization systems and the institutions for biodiversity conservation, and financial aspect. Thus, the sustainability of the project is fair.

In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Responding to the issues to be improved for the first generation NBDS and developing the second-generation NBDS

In order to build the second-generation database system, it was recommended to steadily implement "Program for Monitoring & Evaluation to build Biodiversity Database 2019" in the three years from 2019 to 2021. At the time of the ex-post evaluation in 2020, the budget that was secured was severe against the planned budget, making it necessary to proceed individually with each of the priorities. This included the data quality issues indicated by the users of the first generation NBDS, such as the unification of classification items, the close examination of the data/content, and the biodiversity data collection currently being prepared by BCA. In line with the master plan, it is expected that BCA will take the initiative and implement it to the extent possible in the future, while continuing to mobilize experts from outside institutes and universities specializing in biodiversity conservation.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Indispensable elements for coordination of a wide range of related organizations

Upon implementing the project which involves a wide range of related organizations, to assign a project coordinator who is familiar with the jurisdiction and needs of those organizations in the target country can contribute to improve the efficiency of project implementation. In this project, a Vietnamese coordinator was assigned during the implementation, which helped to smooth communication between the parties concerned and contributed to the efficiency of implementation. It can be said that it was better to allocate such personnel from the beginning of the project. Also, for the sustainability of the project, one idea was to support the activities to form the platform that BCA leads multiple organizations and regularly exchange information and opinions, with facilitation by such coordinator in order to continue the project. For example, taking the pilot project area as one case, forming a discussion forum for data quality scrutiny and exchange of opinions applicable to other protected areas, including MARD and biodiversity conservation researchers, related organizations in target area, etc., aiming to continuing after the

project. During the project implementation, a priority could have been given to project activity of the sustainable platform formation which can effectively involve all stakeholders.

Input of data and information that further contributes to policy implementation

The ultimate goal of building a national biodiversity database system is to use that data to monitor biodiversity conservation and implement countermeasures. With this objective in mind, for example if the purpose of NBDS is most critically stressed on contributing to EIA implementation or use of biodiversity conservation plan, it is therefore essential to scrutinize the content of data and information inputted at the early stages of the project. At the time of project implementation, the NBDS included data that was old or had problems with the data collection method, without any indication of the constraints at the time of data input. It might have been better to have activities to discuss such constraints and input such information in NBDS or as alternative way, separately from NBDS, it should have been noted the indication that how such data should be updated and revised in the future as result of quality review of such data

As there was no dedicated expert staff in BCA to conduct quality assurance of uploaded data, as part of the activity planning at the project planning stage, a suggestion was made to form a committee which mobilized the experts in Viet Nam to conduct quality scrutiny of the NBDS, and then BCA staff could be assigned to be in charge of this activity. Even if the data provider (individual or organization) was to undertake the quality assurance, the screening by BCA was deemed necessary as a government agency. During the implementation of the project, Japanese experts responsible for biodiversity who have experience in implementing EIA and formulating biodiversity conservation plans, were to provide support; however, local experts, would also be appointed and assigned as team members from the beginning of the project if such suitable personnel can be found in target country, which would be the key to ensure sustainable activities after the project.

End