Socialist Republic of Vietnam
Ministry of Natural Resources and Environment
Vietnam Environment Administration

SOCIALIST REPUBLIC OF VIETNAM
THE PROJECT FOR STRENGTHENING CAPACITY OF WATER ENVIRONMENTAL MANAGEMENT IN RIVER BASIN
PROJECT COMPLETION REPORT

JULY 2019

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.
CTI Engineering International Co., Ltd.

GE
JR
19-036


WEMRB IN VIETNAM
105°0'0"E
20°0'0"N
15°0'0"N
10°0'0"N
Hoang Sa Islands
N
W
E
S
LEGEND
Hanoi
Target Provinces in Cau Basin
Target Provinces in Dong Nai Basin
200 100 0 200
Kilometers
PILOT PROJECT AREA IN CAU RIVER BASIN
1:200,000
Bắc Kạn
Tuyên Quang
Thái Nguyên
Lạng Sơn
Phú Thọ
Vĩnh Phúc
Bắc Giang
Quảng Ninh
Bắc Ninh
TP. Hà Nội
Hà Tây
Hải Dương
Hoà Bình
Hưng Yên
TP. Hải Phòng
LEGEND
Target Area
Bắc Giang
Bắc Ninh
Thái Nguyên
PILOT PROJECT AREA IN DONG NAI RIVER BASIN
1:200,000
Binh Phuoc
Lâm Đồng
Tây Ninh
Binh Duong
Đồng Nai
Binh Thuận
TP Hồ Chí Minh
Long An
Ba Ria - Vung Tau
LEGEND
Pilot Project Area
Binh Duong
Ho Chi Minh City
Dong Nai
Ba Ria-Vung Tau
0 10 20 40
Kilometers

Project Completion Report of

The Project for Strengthening Capacity of

Water Environmental Management in River Basin

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List of Attachments

*Attachment 10 is available only in electronic version and is enclosed in the CD-R

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List of Abbreviations

ATC	Advanced Training Course
BOD	Biochemical Oxygen Demand
BTC	Basic Training Course
CA	Capacity Assessment
CD	Capacity Development
CEID	Center for Environmental Information and Data
CEM	Center for Environmental Monitoring
COD	Chemical Oxygen Demand
C/P	Counter Part
DARD	Department of Agriculture and Rural Development
DOC	Department of Construction
DOIT	Department of Industry and Trade
DONRE	Department of Environment and Natural Resources
DOL	Department of Legislation
DWM	Department of Waste Management
DWRM	Department of Water Resource Management
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPC	Environmental Protection Commitment
EPP	Environmental Protection Plan
ESI	Environmental Science Institute
GIS	Geographic Information System
GOJ	Government of Japan
GOV	Government of Vietnam
HCMC	Ho Chi Minh City
IC/R	Inception Report
IZMB	Industrial Zone Management Board
IWRM	Integrated Water resource Management
JCC	Joint Coordination Committee
JET	JICA Expert Team
JICA	Japan International Cooperation Agency
LET	Long-term Expert Team
LEP	Law on Environmental Protection

MARD	Ministry of Agriculture and Rural Development
MOC	Ministry of Construction
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Environment and Natural Resources
PCD	Pollution Control Department
PDM	Project Design Matrix
PMU	Project Management Unit
PP	Pilot Project
PPC	Provincial People's Committee
RBO	River Basin Organization
R/D	Record of Discussion
SA	Service Agency
SDP	Socio-economic Development Plan
SET	Short-term Expert Team
TF	Task Force
TMDL	Total Maximum Daily Load
TPL	Total Pollution Load
VEA	Vietnam Environment Administration
WDSI	Wastewater Discharge Source Inventory
WEMRB	Water Environmental Management in Water Basin
WENID	Wastes and Environmental Improvement Department
WQ	Water Quality

1. Summary of the Project

1.1 Purpose of the Project Completion Report

This Project Completion Report is prepared as the final output of the Project by Vietnamese side and Japanese side together. This report provides an understanding about the whole project activities and results including achievements and recommendations for future steps.

Basically, this report is based on the Activities of Project Design Matrix (PDM) for smooth understanding on Chapter 4 (Output-1), Chapter 5 (Output-2), and Chapter 6 (Outpiut-3). In addition, since the project management activities are important for a technical cooperation project, they are described as Chapter 2. The achievements of the Project are described in Chapter 7, and the recommendations for achieving the project overall goal are described in Chapter 8 as the final chapter.

1.2 Background

Water environmental conditions in Vietnam have been degraded due to an increase of pollution load accompanied by the rapid urbanization and industrial development, and shortage of wastewater treatment facilities as well as their operation and maintenance capabilities. The Government of Vietnam (GOV) inaugurates revised National Strategy for Environmental Protection targeting to 2020 in 2012 focusing on pollution source control and water environmental management. Despite the great effort of GOV and the Ministry of Environment and Natural Resources (MONRE) related to legal and institutional set-up, Vietnam is still suffering from insufficient administrative enforcement capacity on water environment management.

Hence, GOV requested the Government of Japan (GOJ) for implementation of technical assistance titled "The Project for Strengthening Capacity of Water Environmental Management in River Basin (the Project). Responding to the GOV's request, GOJ dispatched the JICA Preliminary Evaluation Mission for discussion with the Vietnamese side and formulation of the Project outline from July 2014 to June 2015. The GOV and JICA signed the Record of Discussion (R/D) of the Project on 24 August 2015.

The main objectives of the Project are as follows:

1) To strengthen policy development and implementation capacity of MONRE/ Vietnam Environment Administration (VEA).
2) To strengthen enforcement capacity of target DONREs, and to institutionalize river basin water environmental management.

1.3 Brief Project Description

1.3.1 Project Title and Objectives

The project title and objectives is described in PDM (ver.3.0) as below.

Project title:	The Project for Strengthening Capacity of Water Environmental Management in River Basin
Overall goal:	Enforcement capacity of MONRE/VEA and DONREs is strengthened, and MONRE/VEA is ready to implement river basin water environmental management system other than the target river basin area.
Project purpose:	Policy development and implementation capacity of MONRE/VEA, and enforcement capacity of target DONREs regarding RBWEM are strengthened and institutionalized.
Output-1:	Capacity of MONRE/VEA and target DONREs in legal document development and enforcement on RBWEM is strengthened, and MONRE/VEA is going to institutionalize RBWEM mechanism.

Output-2: Enforcement capacity on RBWEM of MONRE/VEA and target DONREs is strengthened through implementation of Pilot Projects (PPs).

Output-3: A roadmap for improvement of RBWEM is prepared based on the outcomes of Output-1 and Output-2, and MONRE/VEA is ready to implement further steps toward the Integrated River Basin Water Resource Management (IRBWRM).

Legal document development that one of the major contents of this Project is targeted 6 draft legislative documents. The final titles of 6 draft legislative documents which were agreed with both sides and described in the final PDM are shown below. Originally, these 6 draft legislative documents were to be developed as circulars. Therefore, Vietnamese side and Japanese side used the code from Circular-1 to Circular-6 as the common code.

Circular-1: Final draft Guideline/technical report on coordination mechanism for RBWEM

Circular-2: Circular on assessment of loading capacity

Circular-3: Final draft legalizing document on main wastewater discharge sources for RBWEM

Circular-4: Final draft Guideline of Data and Information Sharing for Loading Capacity Calculation and Wastewater discharge sources Inventory Development

Circular-5: Final draft Circular including regulations on guiding format and procedure of requesting environmental compensation for natural environment, and

Circular-6: Final draft Circular including regulations on stipulating selecting criteria and responsibilities of agency providing environmental monitoring and assessment service to collect evidences compensation and environmental damage; and guiding the setting up and operation of councils for appraising data and proof for determining environmental damages

(Note) The Circular-5 and Circular-6 isare legalized as one unified final draft decree.

1.3.2 Project Period

Duration of Project is as 3.5 years from November 2015 to May 2019.

1.4 Activities

From November 2015, the Project was implemented for strengthening capacity of water environmental management in water basin (RBWEM) for two target river basins, Cau river basin and Dong Nai river basin. The Project consists of three outputs: (i) Output-1 for developing legislative documents for implementing RBWEM, (ii) Outout-2 for capacity development (CD) for loading capacity assessment with pilot projects (PPs), and (iii) Output-3 for proposing required actions for proceeding RBWEM and recommendation to establishment of Integrated Water Resource Management (IWRM) in Vietnam. From November 2015 to May 2019, the activities in the following table have been implemented.

Table 1-1 Activities Implemented by the Project

Item	Contents
Overall contents	➢ 46 times of PMU meetings were held for proper project management from January 2016 to March 2019, and 5 times of JCC meetings were held in March and December 2016, April 2017, May 2018, and April 2019. ➢ 2 times of the Study Tours were held to visit target river basins by northern and southern DONREs jointly. ➢ 3 times training in Japan were held in July 2016, July 2017, and September and October 2018.

Item	Contents
Output-1	➢ Project drafted Circular[1] on loading capacity assessment was integrated into Circular-76. The technical guideline (TG) for Loading Capacity Assessment, supporting the application of simulation model method in river's loading capacity assessment is approved as Decision No.154/2019/QD-TCMT. And Manual on wastewater discharge source inventory (WDSI) were prepared. ➢ Contents on environmental compensation were developed as a part of draft revised decree. ➢ Technical guidelines on coordination mechanism and data and information sharing were prepared.
Output-2	➢ Pollution load analysis was conducted and pollution source inventory were developed in the Pilot Project area. ➢ Basic Training Course (BTC) were implemented from September 2016 to March 2017, and Advanced Training Course (ATC) were implemented from March to September 2017. 230 of the governmental officers and 134 of the officers were trained by BTC and ATC respectively, with the technical materials provided by the JICA Expert Team (JET). ➢ The training material was compiled and published as a VEA publication to use it for the training in post-project phase for not only target provincial DONREs but also other provincial DONREs.
Output-3	➢ As trial activities for coordination and information sharing for water environmental management in river basin among the concerned provinces in each target river basin, 6 times of Task Force meetings were held in September 2016, March 2017, September 2017, December 2017, January 2018 and May 2018. ➢ The outcomes of the PPs and process of preparation of legislative documents were shared with target DONREs by the Task Force meetings mentioned above. ➢ The Action Plan and Overall Plan for RBWEM, and the Road Map for IWRM were prepared.

Source: JET

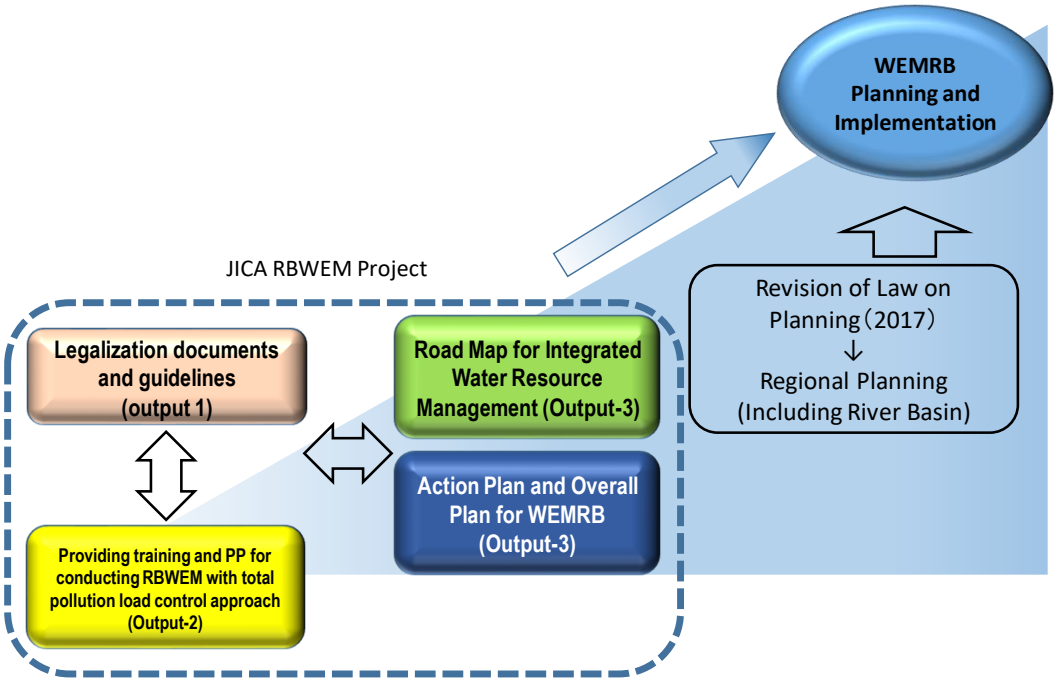
1.5 Project Outcomes

The project outcomes were draft and legalized documents for implementing of RBWEM with total pollution load control approach under Output-1, training and pilot project (PP) for pollution load analysis and loading capacity assessment under Output-2, and Action Plan, Overall Plan, and Road Map prepared under Output-3.

Each Output of the Project has relationship with other Output. For example, the legalized documents prepared under Output-1 were prepared, based on the lessons obtained through training and PP under Output-2. The contents of the plans and road map under Output-3 were examined to increase effectiveness of legalized documents prepared under Output-1. With the outcomes of the Project, it is expected for Vietnamese C/Ps to plan and implement RBWEM with total pollution load control approach.

[1] "Circular" is regulation stipulating technical instructions to conduct governmental policies, enforced by each concerned ministry. The followings are legal documents enforced in Vietnam.

Legal Document	Document Code	Organization in Charge of Enforcing
Law	QH-	Diet
Resolution	NQ-	Diet, Prime minister, Chairman of PPC etc.
Decree	ND-CP	Prime minister
Decision	QD-	Prime minister, Minister etc.
Circular	TT-	Minister etc.
Official Notice	TB-	Minister etc.



Source: JET

Figure 1-1 Project Outcomes

1.6 List of Products, Sub-Contract Work, Technical Training, Workshop etc.

Through the Project, the following products, PPs activity, technical training, workshop etc. have been prepared and conducted.

1) Products

No.	Output	Product Name	Product Form at the End of Project
1	Output-1	Regulating assessment of wastewater receiving capacity and loading capacity of rivers and lakes	Circular 76
			Draft Circular by Project
2		Promulgating the technical guideline for calculation of loading capacity of river water sources	VEA Decision
3		Technical Manual on Wastewater Discharge Source Inventory (WDSI) development for river basin water environment management	Draft Technical Manual
			Draft Circular by Project
4		Guidelines of Data and Information Sharing for Loading Capacity Calculation, and Wastewater Discharge Sources Inventory Development	Draft Guidelines
5		Guideline for Coordination Mechanism in Pollutant Load Discharge Management	Draft Guidelines
6		Environmental compensation report	Draft Circular
			Draft Degree
7	Output-2	The training material on calculation of loading capacity of river water source	Publication
8	Output-3	Action Plan for RBWEM	-
9		Overall Plan for RBWEM	-
10		Road Map for IWRM	-

Source: JET

2) Pilot Projects

#	Output	Contents	Product Form	Product Description
1	Output-2	Pollution Load Analysis (Cau river basin)	QUAL2K model	WQ model/ Database
			Report	Document
2		Pollution Load Analysis (Dong Nai river basin)	MIKE11 model	WQ model/ Database
			Report	Document
3		Research on water quality simulation models used for pollution load and loading capacity calculation and recommendation of model for pilot implementation in Cau and Dong Nai rivers	Report	Document
4		WDSI Preparation (Cau river basin)	Data base	Excel format
			Report	Document
5		WDSI Preparation (Dong Nai river basin)	Data base	Excel format
			Report	Document
6		Environmental Awareness to target students	Hold events	Field activity
			Report	Document
7		Review the current institutional of coordination mechanism serving for the water environmental management in river basin	Report	Document
8		Review of current policy, legal and organizational system on assessment of loading capacity and estimation of discharge permit	Report	Document
9		The Review of Current Legal and Institutional System on Main Wastewater Discharge Sources for RBWEM on River Basin Water Environmental Management in Vietnam	Report	Document
10		Review of the current legal and institutional system on collection, management, exploitation and use of information and data for RBWEM of Vietnam	Report	Document

Source: JET

3) Technical Trainings

No.	Training contents	Expert	Times	Total Participants
1	Training in Japan in 2016 “Strengthening Environmental Management Water Basin”	JET	1 time	11 participants
2	Training in Japan in 2017 “Administrative capacity enhancement for river basin water environmental management in Cau and Dong Nai – Saigon River basin”	JET	1 time	10 participants
3	Training in Japan in 2018 “Administrative capacity enhancement for river basin management”	JET	1 time	10 participants
4	Study Tour	JET	2 times	117 participants
5	BTC-1-1 (Water quality standard and monitoring)	Mr. Takashi Onuma, Mr. Kengo Naganuma	8 times	161 participants
6	BTC-1-2 (Planning and implementation of WDSI)	Mr. Hiroshi Nakano	9 times	136 participants
7	BTC-1-3 (Delineation of watershed, "Rainfall-runoff" analysis, and river water flow analysis)	Mr. Masakazu Miyagi, Mr. Yoshiki Yamamoto	19 times	257 participants

No.	Training contents	Expert	Times	Total Participants
8	BTC-1-4 (Planning and implementation of environmental inspection and pollution source control)	Mr. Kengo Naganuma, Mr. Hiroshi Nakano	17 times	202 participants
9	ATC-1-1 (Discussion on total pollution load and discharge quota with case study in Japan)	Mr. Takashi Onuma, Mr. Ichiro Adachi	8 times	54 participants
10	ATC-1-2-1 (Hands-on training on pollution load analysis and simulation models)	Mr. Yoshiki Yamamoto Mr. Masakazu Miyagi IET, ENTEC	26 times	192 participants
11	ATC-1-2-2 (Hands-on training on loading capacity calculation)	Mr. Yosuke Horie IET, ENTEC	23 times	130 participants
12	ATC-1-3 (Hands-on training on WDSI development with lecture on how to use WDSI for pollution control activity)	Mr. Ta Dang Toan, Dr. Nguyen Minh Son (IET/VAST); Mr. Bui Huy Thong (ENTEC); Mr. Hiroshi Nakano	8 times	50 participants

Source: JET

4) Official meetings/ Project Newsletters

#	Contents	Times	Total Participants
1	Joint Coordination Committee (JCC)	5 times	212 participants
2	Task Force (TF)	10 times	255 participants
3	Project Management Unit (PMU)	45 times	-
4	DONRE visit	-	-
5	Project Newsletters	14 times	-

Source: JET

5) Seminars/ Workshops

#	Title	Date	Total Participants
1	Kick-off Workshop “Toward to the Enforcement of the Water Environmental Management in River Basin – Activities of RBWEM Project”	22/3/2016	46 participants
2	Selection of Simulation Model Workshop	20/4/2016	25 participants
3	Workshop – Consultation on Draft Circular for Stipulation of Procedures to Claim Compensation for Environmental Damages	31/8/2016	80 participants
4	Workshop – Consultation on Draft Circular for Stipulation of Procedures to Claim Compensation for Environmental Damages	7/9/2016	61 participants
5	Joint Workshop on Integrated Water Environmental Management in River Basin. Sub title: The tool for river environment management (About TMDL and TPL)	1/11/2017	53 participants
6	Technical Meeting for Circular-2 development	10/3/2017	29 participants
7	Workshop on Integrated Water Resources Management (IWRM)	21/4/2017	41 participants

#	Title	Date	Total Participants
8	Consultation workshop on Development of Circular 2 and 3 - Technical Meeting (in Dong Nai river basin)	27/6/2017	39 participants
9	Consultation workshop on Development of Circular 2 and 3 - Technical Meeting (in Cau river basin)	29/6/2017	46 participants
10	Retreat Meeting for Finalizing the Technical Guidelines for Calculating Loading Capacity and Discharge Quota	15-16/9/2017	26 participants
11	Technical consultation workshop on legal documents for water environmental management in River Basin.	22/12/2017	46 participants
12	The W/S for dissemination of Project results	1/11/2018	48 participants
13	The final W/S for evaluation of the Project results	11/4/2019	72 participants

Source: JET

2. General

2.1 Project Design Matrix (PDM) and Plan of Operation (PO)

Revision of the Project Design Matrix was conducted three times to reflected surrounding conditions of the Project and recommendation of Counterparts. Attachment 1 show the revision history of PDM and Attachment 2 shows the final project outcomes. Table 2-1 shows the latest Project Design Matrix (PDM ver 3.0) was agreed the contents on 4th JCC meeting held on 10 May 2018 and finalized in 03 July 2018. And the Plan of Operation (PO) with actual progress of the project is shown in Table 2-2.

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Table 2-1 PDM ver 3.0

Project Title: The Project for Strengthening Capacity of Water Environmental Management in River Basin

Duration of Project: November 2015 to May 2019 (3.5 years)

Project Target Area: Cau River Basin (Thai Nguyen Province, Bac Giang Province, and Bac Ninh Province) and Dong Nai River Basin (Binh Duong Province, Dong Nai Province, Ho Chi Minh City, and Ba Ria-Vung Tau Province)

Target Group：Ministry of Natural Resources and Environment (MONRE)/ Vietnam Environmental Administration (VEA), Institute of Environmental Science (ESI), Department of Waste Management and relevant departments, Departments of Natural Resources and Environment (DONREs) of target City and Provinces, and other relevant agencies.

Version - 03: July 2018

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Enforcement capacity of MONRE/VEA and DONREs is strengthened, and MONRE/VEA is ready to implement river basin water environmental management system other than the target river basin area.	1. MONRE/VEA institutionalizes RBWEM mechanism considering the Integrated River Basin Water Resource Management (IRBWRM). 2. Improved RBWEM Committees in Cau river basin and Dong Nai river basin are established. 3. Local authorities in target river basin are explicitly state policy on RBWEM in their Socio-economic Development Plan (SDP). 4. MONRE/VEA designates other important river basins as next targets for further promotion of RBWEM in Vietnam.	1. Prepared legal and official documents by MONRE/VEA. 2. SDP prepared by local authorities.	The principal policy for River Basin Water Environmental Management (WEMRB) in Vietnam is not negatively changed.
Project Purpose Policy development and implementation capacity of MONRE/VEA, and enforcement capacity of target DONREs regarding RBWEM are strengthened and institutionalized.	1. MONRE/VEA and relevant agencies submits the final draft legislative documents (Final Draft Decrees, Circulars or other documents) to the Minister of MONRE. 2. MONRE/VEA share the policy regarding RBWEM mechanism among MONRE/VEA and relevant organizations. 3. MONRE/VEA commences necessary activities in accordance with the action plan and overall plan of RBWEM targeting 2020. 4. Local authorities explicitly state policy on RBWEM in their water environmental management activity.	1. Actual outcomes developed by the Project. 2. Questionnaire survey to MONRE/VEA and target PPCs/ DONREs at initial, mid-term, and final stage of the Project. 3. Data and documents prepared by MONRE/VEA and target DONREs.	The outputs developed by the Project are properly extended by MONRE/ VEA, and local authorities nationwide for promotion of RBWEM.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
	5. MONRE/VEA prepares the road map of IRBWRM proposed.		
Outputs Output-1: Capacity of MONRE/VEA and target DONREs in legal document development and enforcement on RBWEM is strengthened, and MONRE/VEA is going to institutionalize RBWEM mechanism.	1-1 MONRE/VEA prepares more than three (3) final draft legislative documents (Final Draft Decrees, Circulars or other documents) in the following six (6) draft legislative documents in cooperation with JET. 1) Final draft Guideline/technical report on coordination mechanism for RBWEM 2) Circular on assessment of loading capacity 3) Final draft legalizing document on main wastewater discharge sources for RBWEM. 4) Final draft Guideline of Data and Information Sharing for Loading Capacity Calculation and Wastewater discharge sources Inventory Development 5) Final draft Circular including regulations on guiding format and procedure of requesting environmental compensation for natural environment, and *(Note)* 6) Final draft Circular including regulations on stipulating selecting criteria and responsibilities of agency providing environmental monitoring and assessment service to collect evidences compensation and environmental damage; and guiding the setting up and operation of councils for appraising data and proof for determining environmental damages. *(Note)* (Note) The indicator 1-1 5) and 1-1 6) will be legalized as one unified final draft decree. 1-2 More than 10 C/Ps (80%) receive technical training, and more than 6 C/Ps (50%) obtain enough skills	1-1 Data and documents prepared by MONRE/VEA and target DONREs. 1-2 Actual nos. of outcomes developed in the Project, and their use conditions. 1-3 Training and discussion records, and contents of proposals. 1-4 Presentation materials, records, and comments on seminars and workshops.	Target local authorities state commitments to cooperate with the Project. Related organizations under the target local authorities such as DARD, DOC, DOIT, IZMB, Dept of Environmental Police, etc., cooperate with the Project.

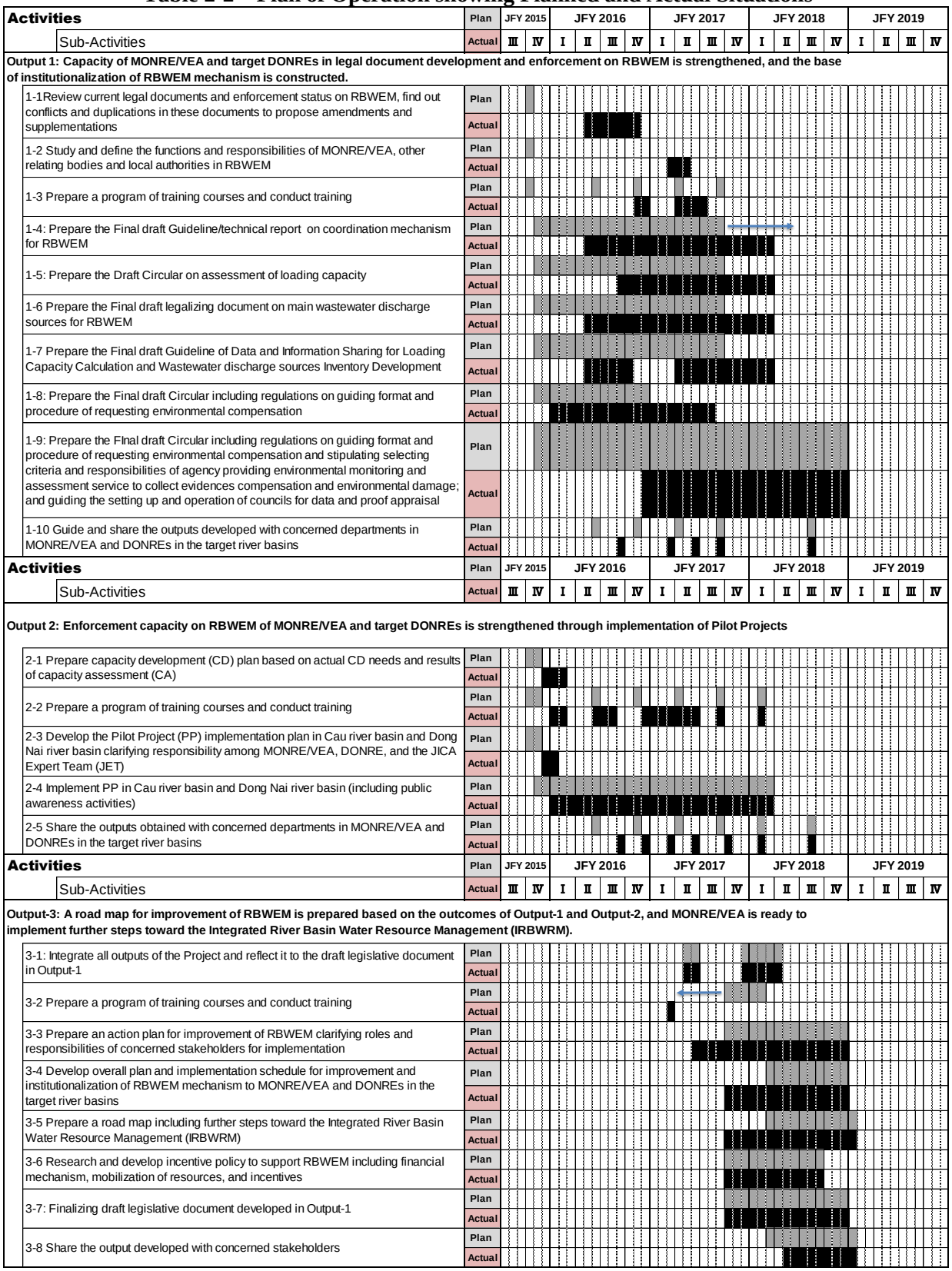
Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
	and knowledge for development of policies and actual state management activities of RBWEM.		
Output-2: Enforcement capacity on RBWEM of MONRE/VEA and target DONREs is strengthened through implementation of Pilot Projects (PPs).	2-1 More than 80% of activities of PP in Cau and Dong Nai river basins are completed. 2-2 More than 50 C/Ps (70%) receive technical training, and more than 35 C/Ps (50%) obtain enough skills and knowledge for development of enforcement tools and actual state management activities of RBWEM. 2-3 More than 30 C/Ps (40%) obtain enough skills and knowledge for planning and implementation of RBWEM and 2 to 3 Target DONREs can assess loading capacity in each province, and VEA can assess it in the target river basins. 2-4 More than 40% of target DONREs prepare the assessment of loading capacity in own river basin. 2-5 More than 2 times of workshops and seminars are conducted to share and disseminate outcomes obtained in the course of the Project.	2-1 Data and documents prepared by MONRE/VEA and target DONREs. 2-2 Actual outcomes and tools developed by the Project, and their use conditions. 2-3 Training and discussion records, and contents of proposals. 2-4 Result of capacity assessment. 2-5 Records and comments on seminars and workshops.	
Output-3: A road map for improvement of RBWEM is prepared based on the outcomes of Output-1 and Output-2, and MONRE/VEA is ready to implement further steps toward the Integrated River Basin Water Resource Management (IRBWRM).	3-1 More than 10 C/Ps receive technical training, more than 5 C/Ps are trained and obtained enough skills and knowledge for implementation of the road map. 3-2 MONRE/VEA takes initiative to coordinate necessary activities to prepare the final draft legislative documents (Final Draft Decrees, Circulars or equivalent documents) based on the draft legislative documents developed in Output-1 receiving support by JET. 3-3 Inter-provincial coordination models are proposed in Cau river basin and Dong Nai river basin. 3-4 VEA develops the plans to manage RBWEM mechanism referring proposed draft legislative documents developed by the Project. 3-5 Based on the Project results, MONRE/VEA develop and revise the road map.	3-1 Data and documents prepared by MONRE/VEA and target DONREs. 3-2 Training and discussion records, and contents of proposals. 3-3 The Final Draft Circulars. 3-4 The roadmap prepared and presentation records. 3-5 Actual outcomes and tools developed by the Project, and their use conditions. 3-6 Records and comments on seminars and workshops.	

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Activities **Output-1: Capacity of MONRE/VEA and target DONREs in legal document development and enforcement on RBWEM is strengthened, and MONRE/VEA is going to institutionalize RBWEM mechanism.** Activity 1-1: Review current legal documents and enforcement status on RBWEM, and find out conflicts and duplications in these documents to propose amendments and supplementations Activity 1-2: Study and define the functions and responsibilities of MONRE/VEA, other relating bodies and local authorities in RBWEM Activity 1-3: Prepare a program of training courses and conduct training Activity 1-4: Prepare the Final draft Guideline/technical report on coordination mechanism for RBWEM Activity 1-5: Prepare the Draft Circular on assessment of loading capacity Activity 1-6: Prepare the Final draft legalizing document on main wastewater discharge sources for RBWEM Activity 1-7: Prepare the Final draft Guideline of Data and Information Sharing for Loading Capacity Calculation and Wastewater discharge sources Inventory Development Activity 1-8: Prepare the Final draft Circular including regulations on guiding format and procedure of requesting environmental compensation Activity 1-9: Prepare the Final draft Circular including regulations on stipulating selecting criteria and responsibilities of agency providing environmental monitoring and assessment service to collect evidences compensation and environmental damage; and guiding the setting up and operation of councils for data and proof appraisal Activity 1-10: Guide and share the outputs developed with concerned departments in MONRE/VEA and DONREs in the target river basins	**Inputs** **Japanese side** 1) Long Term Expert -Team Leader/ Project Coordination/ Environmental Management Policy 2) Short Term Expert - River Basin Water Environmental Management - Water Quality Monitoring and Simulation Model Analysis - Pollution Sources Inventory and Inspection - Pollution Load Analysis - Pollution Control Measures - Water Resources/Hydrology - Institutional/Financial Planning and Compensation - Data and Information Management - Public Awareness - Coordinator 3) Seminars and Workshops 4) Training in Japan or third country: 3 times during the course of the Project (for MONRE/VEA and DONREs) 5) Study Tour in Vietnam: 2 times during the course of the Project (For 2days and 3days tour for stakeholder related to RBWEM) 6) Minimum Equipment and Vehicles necessary for Project Activities 7) Local Consultants for Sub-contract Works esp. for PP		**Pre-conditions** The Project is officially approved by the authority of GOV. MONRE concludes an agreement with target provinces on Project implementation and cooperation.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Output-2: Enforcement capacity on RBWEM of MONRE/VEA and target DONREs is strengthened through implementation of Pilot Projects (PPs). Activity 2-1: Prepare capacity development (CD) plan based on actual CD needs and results of capacity assessment (CA) Activity 2-2: Prepare a program of training courses and conduct training Activity 2-3: Develop the Pilot Project (PP) implementation plan in Cau river basin and Dong Nai river basin clarifying responsibility among MONRE/VEA, DONRE, and the JICA Expert Team (JET) Activity 2-4: Implement PP in Cau river basin and Dong Nai river basin including public awareness Activity 2-5: Share the outputs obtained with concerned departments in MONRE/VEA and DONREs in the target river basins	**Vietnamese side** 1) Counterpart (C/P) Personnel -MONRE/VEA -DONREs 2) Project Office Space at MONRE/VEA and target River Basins 3) Budget Allocation for Salary and other Expenditure for C/P during the Project Period. 4) Budget Allocation for Running cost of Equipment procured under the Project		
Output-3: A road map for improvement of RBWEM is prepared based on the outcomes of Output-1 and Output-2, and MONRE/VEA is ready to implement further steps toward the Integrated River Basin Water Resource Management (IRBWRM). Activity 3-1: Integrate all outputs of the Project and reflect it to the draft legislative document in Output-1 Activity 3-2: Prepare a program of training courses and conduct training Activity 3-3: Prepare an action plan for improvement of RBWEM clarifying roles and responsibilities of concerned stakeholders for implementation Activity 3-4: Develop overall plan and implementation schedule for improvement and institutionalization of RBWEM mechanism to MONRE/VEA and DONREs in the target river basins Activity 3-5: Prepare a road map including further steps toward the Integrated River Basin Water Resource Management (IRBWRM) Activity 3-6: Research and develop incentive policy to support RBWEM including financial mechanism, mobilization of resources, and incentives Activity 3-7: Finalizing draft legislative document developed in Output-1 Activity 3-8: Share the outputs developed with concerned stakeholders			

Source: Minutes of Meeting of 4th JCC

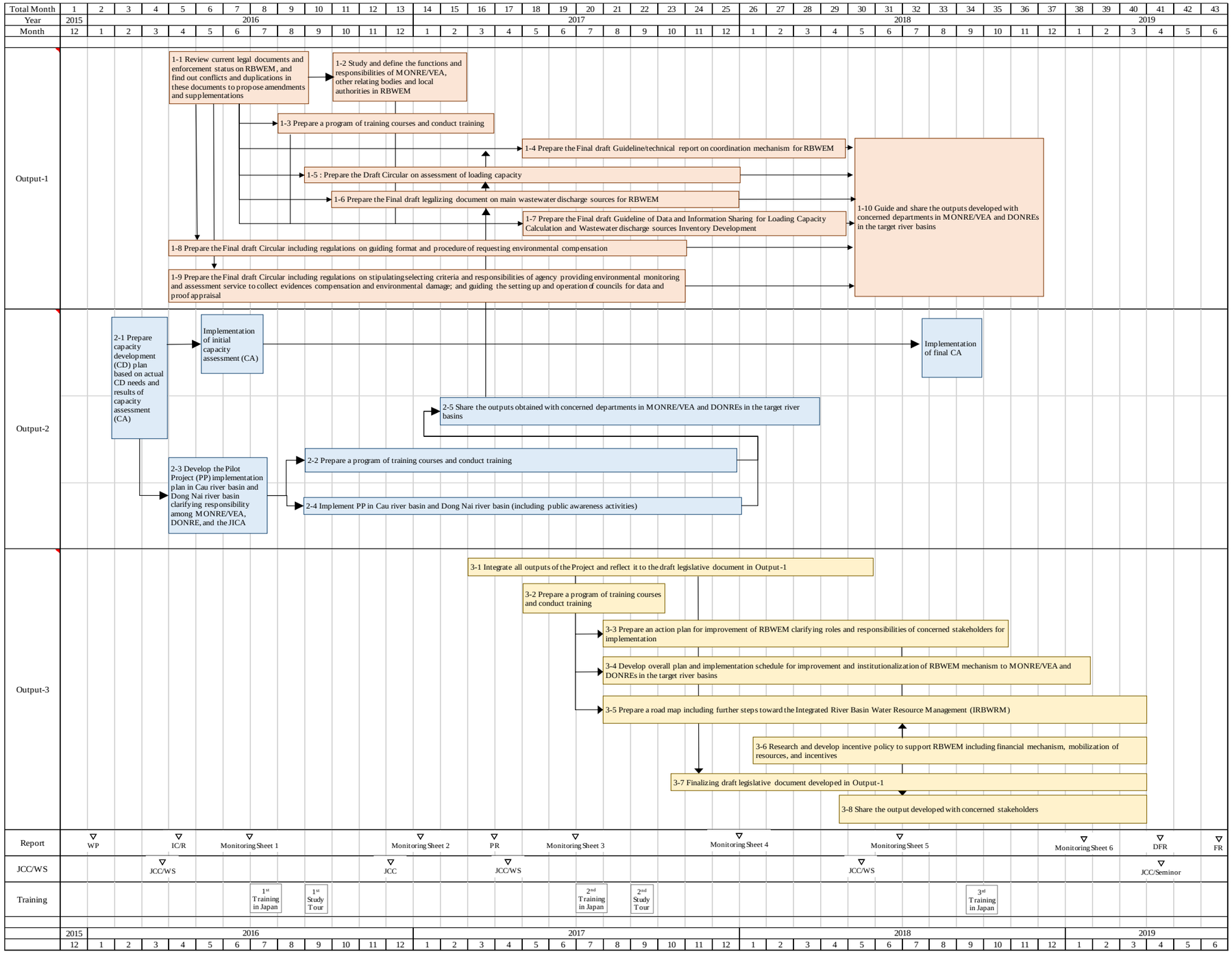
Table 2-2 Plan of Operation showing Planned and Actual Situations



Source: prepared by ESI, WENID, and the JICA Expert Team (JET)

2.2 Workflow

The workflow and its schedule of the JICA Expert Team in the Project are shown in Source: JET Figure 2-1.



Source: JET

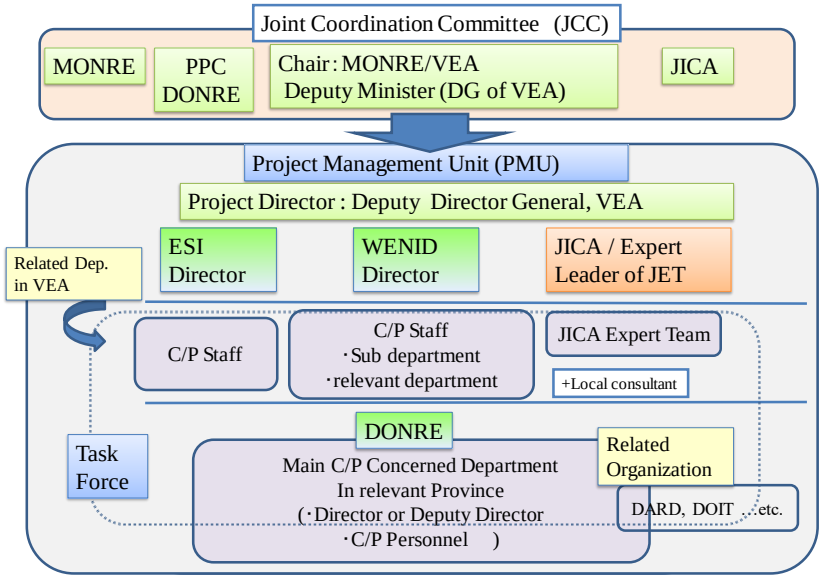
Figure 2-1 Workflow

2.3 Project Implementation Structure

At the beginning of the Project, the main C/Ps of the Project were Department of Waste and Environmental Improvement Department (WENID) and Institute of Environment and Science (ESI) in VEA, and DONREs of 7 target provinces. The VEA was restructuring during the project implementing period from 10 May 2018 based on the Decision No.15/2018/QD-TTg Defining functions, tasks, powers and organizational structure of General Department of Environment Administration under the Ministry of Natural Resources and Environment, dated on 12 March 2018. Basically, there is no changes of the target group as shown in Figure 2-3 of revised items in the PDM. The only change of project implementation structure was "Wastes and Environmental Improvement Department (WENID)" to "Department of Waste Management (DWM) and relevant departments".

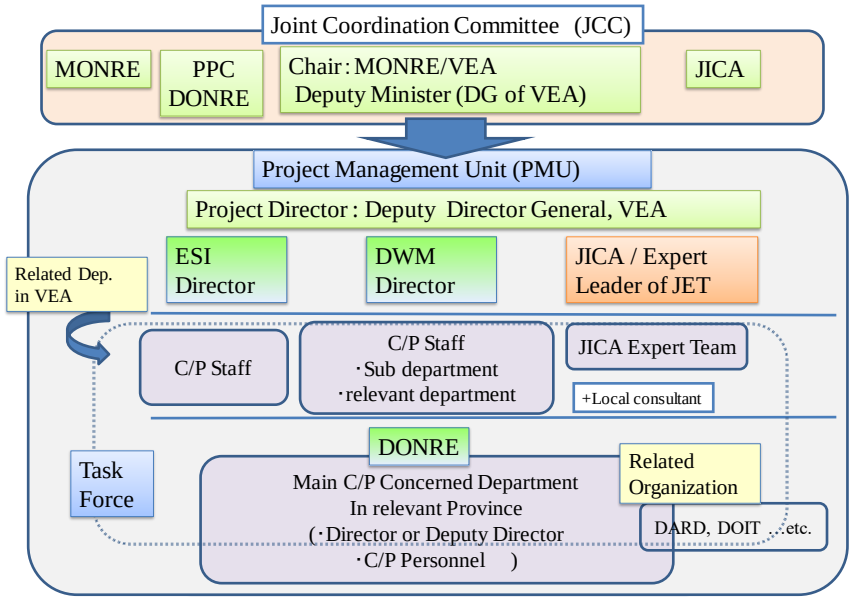
2.3.1 Outline of Project Implementation Structure

The project implementation structure both before and after restructuring of VEA are shown in Figure 2-2 and Figure 2-3 respectively. The PPs were implemented until the end of 2017 and implementation structure is shown in Figure 2-4.



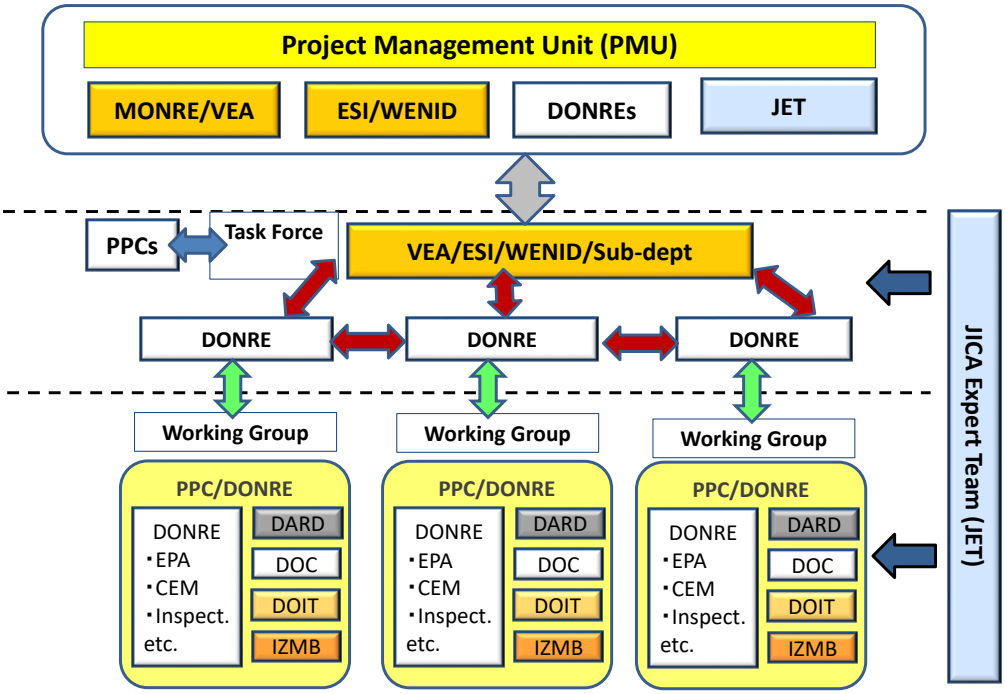
Source: R/D for the Project, 24th August 2015

Figure 2-2 Project Implementation Structure (Until May 2018)



Source: R/D for the Project, 24th August 2015 and modified by JET

Figure 2-3 Project Implementation Structure (From May 2018)



Source: R/D for the Project, 24th August 2015

Figure 2-4 PPs Implementation Structure

2.3.2 Function of Each Institutional Body

(1) Joint Coordination Committee (JCC)

The Joint Coordination Committee (JCC) is a supreme decision-making organization of the Project, which consists of the representatives from MONRE (VEA, ICD, DWRM and so on), target PPC/DONREs, and JICA including the JICA Vietnam Office. A chairperson of JCC is the Deputy

Minister of MONRE or the Director General of VEA, and JCC meeting was held at least once a year during the Project period in Hanoi. Major functions of JCC are as follows:

a) To coordinate inter-department matters in MONRE, and matters between MONRE and PPC/DONRE.

b) To decide objective and direction of the Project to PMU, and to steer its operation.

c) To check and approve all plans and activities related to the Project.

d) To nominate and approve members of PMU.

e) To monitor and evaluate progress and results of the Project, and to comment and advise to PMU.

f) To confirm reports and outcomes to be prepared and developed in the course of the Project.

(2) Project Management Unit (PMU)

The Project Management Unit (PMU) is a management organization of the Project, which consists of the representatives from ESI and WENID (or DWM) in VEA, target DONREs, and the JICA Expert Team (JET). PMU held regular meeting (monthly) during the Project in principle. Major functions of PMU are as follows:

a) To coordinate inter-department matters in MONRE/VEA, and between MONRE/VEA and DONREs.

b) To nominate and approve members of the Task Force (TF) and the Working Group (WG).

c) To plan the activities related to the Project.

d) To monitor and evaluate progress and results of the Project, and to comment and advise to TF and WG.

e) To report progress and results of the Project to JCC, and feedback comments from JCC to TF and WG.

f) To check the reports and outcomes to be prepared and developed in the course of the Project.

(3) Task Force (TF)

The Task Force (TF) is a coordination and management organization of PPs especially inter-provincial technical matters of the Project. So, it should be established in Cau river basin and Dong Nai river basin. Each TF consists of the representatives from ESI and WENID including sub-department in VEA, WG members in target DONREs in Cau river basin or Dong Nai river basin, and JET. A chairperson of TF is selected in the VEA, and TF meeting is held 4 times a year during the Project in principle. Results of activities of TF should be used and reflected for development river basin coordination mechanism. Major functions of TF are as follows:

a) To monitor progress of WG activities.

b) To review and examine PPs activities.

c) To discuss project management issues.

d) To coordinate inter-provincial technical matters concerning to implementation of the PPs among target DONREs in Cau river basin and Dong Nai river basin.

e) To cooperate actual implementation of PPs in each river basin.

f) To share information and result for effective and efficient implementation of PPs.

g) To discuss and solve inter-provincial technical issues including IWRM.

h) To check and evaluate outcomes of PPs from viewpoint of river basin, and feedback it to WG in each target DONRE.

i) To report progress and results of PPs to PMU, and feedback comments from PMU to WG in each DONRE.

(4) Working Group (WG)

The Working Group (WG) is an actual implementation organization of PPs in each target province. So, it should be established in each target DONRE. Each WG consists of DONRE and concerned departments such as DOC, DARD, DOIT, IZMB, and so on. A leader of WG is the representative of each DONRE. Major functions of WG are as follows:

a) To plan, manage, implement, and supervise PPs activities.

b) To coordinate inner-provincial technical matters of PPs.

c) To share information and result for effective and efficient implementation of PPs in each DONRE.

d) To check and evaluate outcomes of PPs from viewpoint of river basin.

e) To report progress and results of PPs to TF and PMU.

Table 2-3 Function of Each Organization

	Joint Coordination Committee: JCC	Project Management Unit: PMU	Task Force: TF	Working Group: WG
Function	- To facilitate inter-organizational coordination. - To monitor the progress of the Project activities. - To review and examine the framework of the Project. - To discuss and advise on major issues which arise during the Project period. - To approve all matters of PJ officially	- To coordinate inter-department matters in MONRE, and between MONRE/VEA and DONREs - To nominate and approve members of the Task Force (TF) and the Working Group (WG) - To plan activities of the Project - To monitor and evaluate progress and results of the Project, and to comment and advise to TF and WG - To report progress and results of the Project to JCC, and feedback comments from JCC to TF and WG - To check the reports and outcomes to be prepared and developed in the course of the Project	- To monitor the progress of the Working Group Activities - To review and examine the PPs activities - To discuss about project management Issues - To facilitate inter-provincial coordination - To conclude lessons and learnt of the project activities - To consider the road map of IWRM - To report progress and important points to JCC	Main body to conduct PPs (-Coordination activity should be designed) Example - To be implementing PPs activities - To collect all data for PPs - To access and calculate TPL - To identify the WDSI etc.

	Joint Coordination Committee: JCC	Project Management Unit: PMU	Task Force: TF	Working Group: WG
Member	Chair: MONRE/VEA Leader MONRE - ESI, WENID (or DWM) - DWRM - ICD JICA - VN office - Expert The relevant organizations	Chari: Deputy Director General of VEA VEA - ESI, DWM JICA - JICA Expert Team	TF is set in each river basin (Cau river basin and Dong Nai river basin) MONRE WENID (or DWM), ESI PPC - Representative of PPC - DONRE - Others	- DONRE in each province - Relevant organization (DOIT, DARD etc.)
Frequency	Yearly	Weekly/Biweekly	Half-yearly	Weekly / Daily
Place	Hanoi	Hanoi	Each river basin area (Cau: Hanoi, Dong Nai: Ho Chi Minh City (HCMC))	The project office in each river basin area Cau river basin: Bac Giang Dong Nai river basin: BinDuong
Activities	To hold meeting for approving the project issue officially	- To hold meeting - To conduct logistic work for PPs and technical training - To organize JCC meeting, seminar, workshop and TF meeting - To submit and report of the project progress to JCC	- To hold meeting - To organize seminar, workshop - To submit and report of the project progress	- To conduct PPs activities - To organize weekly meeting - To develop report of PPs activities
Output	- JCC report (Minutes of Meeting)	- PMU meeting memo	- TF Report	- Activity Report - Technical reports related to PPs

Source: JET

2.3.3 Major Members of Vietnamese Side

In order to ensure the effective coordination among the Japanese and Vietnamese side for management of project activities and archiving project objectives, project members are established. Table 2-4 and Table 2-5 lists JCC and PMU members respectively. Table 2-6 lists the Task Force members, and Table 2-7 lists WG members.

Table 2-4 List of JCC Members

No.	Name	Position in the Project	Organization
1	Dr. Mr. Võ Tuấn Nhân	Head of JCC	Deputy Minister of MONRE
2	Dr. Mr. Hoàng Văn Thức	Deputy Head of JCC	Deputy Director General of VEA, MONRE
3	Mr. Lê Văn Hợp	JCC member	Director of Legislation Department, MONRE
4	Mr. Lê Văn Hữu	JCC member	Deputy Director of Planning Department, MONRE
5	Ms. Nguyễn Thị Huyền	JCC member	Deputy Director of Personnel and Organization Department, MONRE
6	Mr. Lê Ngọc Tuấn	JCC member	Deputy Director of International Cooperation Department, MONRE
7	Mr. Nguyễn Minh Khuyến	JCC member	Deputy Director of DWRM, MONRE
8	Mr. Nguyễn Việt Thắng	JCC member	Deputy Director, DICST, VEA

No.	Name	Position in the Project	Organization
9	Mr. Nguyễn Thanh Tuấn	JCC member	Director of Thai Nguyen DONRE
10	Mr. Vũ Văn Tưởng	JCC member	Deputy Director of Bac Giang DONRE
11	Mr. Nguyễn Đại Đồng	JCC member	Deputy Director of Bac Ninh DONRE
12	Mr. Đặng Minh Đức	JCC member	Director of Dong Nai DONRE
13	Ms. Nguyễn Thị Thanh Mỹ	JCC member	Deputy Director of Ho Chi Minh City DONRE
14	Mr. Nguyễn Hồng Nguyên	JCC member	Deputy Director of Binh Duong DONRE

Source: JET

Table 2-5 List of PMU Members

No.	Name	Position in the Project	Organization
1	Dr. Mr. Hoàng Văn Thức	Director of PMU	Deputy Director General of VEA
2	Dr. Mr. Phạm Văn Lợi	Acting Deputy Director of PMU	Director of ESI - VEA
3	Mr. Nguyễn Thượng Hiền	Deputy Director of PMU	Director of WENID (DWM), VEA
4	Ms. Nguyễn Thị Hồng Phương	PMU member	Chief accountant of ESI, VEA
5	Dr. Ms. Nguyễn Hoàng Phương Lan	PMU member, Project Coordinator	Deputy head of Division on Sustainable Development & Environmental Protection, ESI, VEA
6	Ms. Lê Thanh Nga	PMU member	Officer, Division on Sustainable Development & Environmental Protection. ESI, VEA
7	Ms. Trần Lệ Anh	PMU member	Director of the Cau River Basin Environmental Protection Sub-Department, VEA

Source: JET

Table 2-6 List of Task Force Members

No.	Name	Organization	No.	Name	Organization
1	Dr. Mr. Hoàng Văn Thức	VEA	11	Mr. Lưu Xuân Hùng	Bac Ninh DONRE
2	Dr. Phạm Văn Lợi	ESI	12	Mr. Nguyễn Hồng Nguyên	Binh Duong DONRE
3	Dr. Ms. Nguyễn Hoàng Phương Lan	ditto	13	Mr. Tào Mạnh Quân	ditto
4	Mr. Nguyễn Thượng Hiền	WENID (DWM)	14	Mr. Trần Thanh Quang	ditto
5	Ms. Trần Lệ Anh	ditto	15	Mr. Đặng Minh Đức	Dong Nai DONRE
6	Mr. Nguyễn Thanh Tuấn	Thai Nguyen DONRE	16	Ms. Võ Niệm Tường (October 2015-April2018) Mr. Trần Trong Toàn	ditto
7	Ms. Hoàng Thị Liên	ditto	17	Ms. Nguyễn Thị Thanh Mỹ	HCMC DONRE
8	Mr. Vũ Văn Tưởng	Bac Giang DONRE	18	Mr. Trần Nguyên Hiền	ditto
9	Mr. Trương Công Đại	ditto	19	Mr. Phan Văn Manh (October 2015- August 2017) Mr. Đặng Sơn Hải	Ba Ria– Vung Tau DONRE
10	Mr. Nguyễn Đại Đồng	Bac Ninh DONRE	20	Mr. Nguyễn Dũng	ditto

Source: JET

The following Table lists the members for WG in each municipality.

Table 2-7 List of WG Members

No.	Name	Organization	No.	Name	Organization
Thai Nguyen DONRE			Binh Duong DONRE		
1	Ms. Hoàng Thị Liên	Head of Thai Nguyen EPA	48	Mr. Trần Thanh Quang	Head of EPA, DONRE
2	Ms. Trần Thị Hương	Deputy Head of EPA	49	Mr. Tào Mạnh Quân	Director of CEM
3	Ms. Trần Thị Minh Hải	Deputy Director of CEM, DONRE	50	Mr. Ngô Thành Mua	D'ty Head, Poll Control Div, EPA
4	Mr. Vương Văn Thanh	Head, Water Resources, Hydro – mete'gy and Climate Change Div	51	Mr. Phan Phục Nghiệp	Deputy Head, Poll Control Div, EPA
5	Mr. Bùi Học Phi	D'ty Head of Poll Control Div, EPA	52	Ms. Võ Thị Thảnh	Officer, Pollution Control Div, EPA
6	Mr. Nguyễn Anh Đức	Officer, Pollution Control Div, EPA	53	Mr. Ngô Công Lý	D'ty Head, Inspection Div, DONRE
7	Ms. Đinh Thị Đương	Planning and General Office, EPA	54	Ms. Cao Thị Thủy Tiên	Water Resources, Minerals, and Hydro-meteorology Div
8	Mr. Dương Như Long	Officer, EIA Division, EPA	55	Mr. Nguyễn Thế Tùng Lâm	Head of Consulting Division, CEM
9	Ms. Nguyễn Thu Hương	Officer, Investment Appraisal Division, Env'al Protection Fund	56	Mr. Trần Minh Thịnh	Officer, Consulting Division, CEM
10	Mr. Lại Trung Hiếu	Deputy Head of Inspection Division	57	Mr. Trịnh Xuân Đạt	Head of Technological Dep't Div, Center for Information, Technology in Env't and Natural Resources
11	Mr. Đoàn Trường Sơn	Officer, Inspection Division	Dong Nai DONRE		
12	Mr. Phùng Ngọc Mạnh	Head of Pollution Control Div, EPA	58	Ms. Võ Niệm Tường (Oct 2015 – April 2018) Mr. Trần Trọng Toàn	Head of EPA
13	Mr. Nguyễn Đình Thuấn	Water Resources, Hydro-mete'gy and Climate Change Div	59	Mr. Trình Trọng Trung	Head of EIA Division, EPA
14	Ms. Phạm Thu Hạnh	Head, Data and Documentation, Center for Info'n and Technology in Env't and Natural Resources	60	Mr. Đỗ Minh Hoàng	Deputy Head of EIA Division, EPA
15	Ms. Hoàng Thị Oanh	Officer, General and Administrative Division, Thai Nguyen EPA	61	Mr. Võ Nguyên Vũ	Officer, EIA Division, EPA
16	Mr. Trịnh Đức Cường	D'ty Head, Monitoring station, CEM	62	Ms. Lê Ngọc Hân	Deputy Head, Pollution Control Div, EPA
17	Mr. Dương Văn Hùng	Deputy Head of Monitoring station, CEM	63	Mr. Lê Văn Bình	Deputy Head of Inspection, DONRE
18	Mr. Nguyễn Tiến Phong	Head, Automatic Monitoring station, CEM	64	Mr. Hứa Quốc Bách	Deputy Head of Water Resources Division, DONRE
19	Mr. Đoàn Văn Vũ	Head of Environmental Technologies, CEM	65	Ms. Nguyễn Thị Mai Liên	Deputy Director of CEM, DONRE
20	Mr. Hoàng Hữu Thủy	Head of Infrastructure Division, DOC	66	Mr. Phạm Văn Huynh	Head of Monitoring Division, CEM
21	Mr, Nguyễn Quang Hưng	Officer, Industrial Safety Techniques and Env't Div, DOIT	67	Mr. Phạm Huỳnh Quang Hiếu	Deputy Director of Center for Information and Technology
22	Mr. Nguyễn Vinh Thái	Deputy Head, Div, Work Construction and Man't Div, DARD	68	Mr. Phạm Văn Bình	Head of Infrastructure Division, DOC
23	Ms. Nguyễn Thị Thùy Dương	Deputy Head of General Planning Division, EPA	69	Mr. Khúc Ngọc Thông	Deputy Head, Div, Work Construction and Man't Div, DARD

No.	Name	Organization	No.	Name	Organization
Bac Giang DONRE			70	Mr. Trần Hải Quân	Officer, DOIT
24	Mr. Ngô Quang Trường	Deputy Head of EPA	71	Mr. Phạm Việt Phương	Deputy Director, Department of Planning and Investment
25	Ms. Đàm Thị Hương Giang	Deputy Head of EPA	72	Mr. Nguyễn Trung Thành	Deputy Head of Environmental Div, IZMB
26	Mr. Hoàng Văn Chiến	Head of EIA Division, EPA	Ho Chi Minh DONRE		
27	Mr. Nguyễn Văn Trọng	Head of Pollution Control Div, EPA	73	Mr. Trần Nguyên Hiền	Head of EPA
28	Ms. Nguyễn Thị Thu	Deputy Head of Pollution Control Division, EPA	74	Mr. Tống Viết Thành	Deputy Head, Water Resources, and Minerals Div,
29	Mr. Nguyễn Văn Dũng	Officer, Pollution Control Division, EPA	75	Ms. Nguyễn Tuyết Phương	Deputy Head, Inspection Division
30	Mr. Phạm Trí Nam	Deputy Head, Water Resources Management Division	76	Bà Lê Thị Thanh Dung	Deputy Head, Pollution Control Division, EPA
31	Ms. Nguyễn Thị Bình	Officer, Inspection Division	77	Mr. Đỗ Minh Luân	Deputy Head, Pollution Control Division, EPA
32	Ms. Nguyễn Thị Thu Huyền	Head of Monitoring Division, CEM	78	Mr. Thái Hoàng Vũ	Officer, Inspection Division
33	Mr. Vũ Hoàng Giang	Acting Deputy Head of division, Center for Info'n and Technology	79	Mr. Võ Ngọc Châu	Officer, Water Resources, and Minerals Div,
Bac Ninh DONRE			80	Ms. Huỳnh Phan Thùy Trang	Deputy Head of Div, CEM
34	Mr. Nguyễn Đại Đồng	Deputy Director of DONRE	81	Mr. Bùi Hải Thiên Vũ	Officer, Pollution Control Division, EPA
35	Mr. Lưu Xuân Hùng	Acting Deputy Head of EPA/Acting Deputy Head of WG	82	Ms. Huỳnh Xuân Lan	Officer, Pollution Control Division, EPA
36	Mr. Lê Đức Thọ	Deputy Head of EPA/Deputy Head of WG	Ba Ria-Vung Tau DONRE		
37	Mr. Nguyễn Thành Bắc	Head, Water Resources, Hydro-mete'gy and Climate Change Div,	83	Mr. Nguyễn Dũng	Deputy Head of EPA
38	Ms. Nguyễn Hạnh Huyền	Head of Inspection Division	84	Mr. Trần Tiến Dũng	Deputy Head, Pollution Control Division, EPA
39	Mr. Nguyễn Khắc Việt	Director of Center for Information Technology and Engineering	85	Ms. Lê Tất Vân Nga	Officer, Pollution Control Division, EPA
40	Mr. Nguyễn Văn Bình	Director of CEM	86	Ms. Trần Thị Mỹ Hạnh	Officer, Pollution Control Division, EPA
41	Mr. Nguyễn Đức Hiếu	Head of Communication and Biodiversity Division, EPA	87	Mr. Trần Ngọc Mẫn	Officer, EIA Division, EPA
42	Mr. Nguyễn Tiến Bình	Head of Pollution Control Div, EPA	88	Ms. Trần Ngọc Thanh	Deputy Director of CEM
43	Mr. Đàm Ngân	Deputy Head of EIA Division, EPA	89	Ms. Nguyễn Thị Lệ Hằng	Deputy Head of Analysis Division, CEM
44	Ms. Trương Thị Bích Phượng	Head of Administrative and General Division, EPA	90	Ms. Nguyễn Thị Vân	Officer, Water Resources, Hydrology, and Meteorology Division
45	Mr. Phan Khắc Huê	Head of Monitoring Division, CEM	91	Ms. Tăng Thị Diễm Mi	Officer, Inspection Division
46	Mr. Nguyễn Ngọc Tuấn	Deputy Head, Technological Dev't Division, Center for Info'n Technology and Engineering	92	Mr. Nguyễn Quốc Tuấn	Head of Technological Development Division, Center for Info'n Technology and Engineering
47	Ms. Phạm Thị Huyền	Officer, Communication and Biodiversity Division, EPA			

Source: JET

2.3.4 Implementation Structure of Japanese Side

The Japanese side consists of the JICA Long-term Experts Team (LET) and the Short-term Expert Team (SET). LET is dispatched during the project period. In the actual plan, Project coordinator is dispatched in 1st year of the project. The member list of JET and the assignment schedule of SET at the end of Project are shown in Table 2-8 and Table 2-9, respectively.

Table 2-8 List of Japanese Side's Members

No.	Name	Position
	Long-term expert team (LET)	
1	Mr. Ichiro Adachi	Team Leader/ Environmental Management Policy
2	Mr. Ito Hideo	Project Coordinator (Nov. 2015 to Dec. 2016)
	Mr. Masaru Yamada	Project Coordinator (From Jan, 2017 to Nov, 2018)
	Short-term expert team (SET)	
1	Mr. Yoichi Iwai (to Dec.2016)	Team Leader/River Basin Water Environmental Management/Water Environmental Policy (including Environmental Compensation)
	Mr. Kengo Naganuma (From Jan.2017)	
2	Mr. Takashi Onuma	Sub-Team Leader/Water Quality Monitoring
3	Mr. Yoshiki Yamamoto	Simulation Model Analysis
4	Mr. Hiroshi Nakano	Wastewater Discharge Source Inventory (WDSI)/Pollution Source Control Measures-1 (Industrial Waste Water)
5	Mr. Kengo Naganuma	Inspection Technology
6	Mr. Yousuke Horie	Pollution Load Analysis
7	Mr. Tsuyoshi Kawamoto	Pollution Source Control Measures-2 (Domestic Wastewater)
8	Mr. Masakazu Miyagi	Water Resource Management
9	Mr. Takayasu Otake	Administrative and Financial Institution Building
10	Mr. Keiichi Takahashi	Data Management-1/ Information Disclosure and Public Awareness
11	Mr. Kentaro Yamamoto	Data Management-2/ Coordination

Source: JET

Table 2-9 Assignment Schedule of SET (as of April 2019)

	Name	Position	Grade	2015 11	2015 12	2016 1	2016 2	2016 3	2016 4	2016 5	2016 6	2016 7	2016 8	2016 9	2016 10	2016 11	2016 12	2017 1	2017 2	2017 3	2017 4	2017 5	2017 6	2017 7	2017 8	2017 9	2017 10	2017 11	2017 12	2018 1	2018 2	2018 3	2018 4	2018 5	2018 6	2018 7	2018 8	2018 9	2018 10	2018 11	2018 12	2019 1	2019 2	2019 3	2019 4	2019 5	2019 6	2019 7	2019 8	2019 9	Total MM
In Vietnam	Yoichi IWAI	Team Leader/River Basin Water Environmental Management/Water Environmental Policy (including Environmental Compensation)	2																																														5.97
	Kengo NAGANUMA	Team Leader/River Basin Water Environmental Management/Water Environmental Policy (including Environmental Compensation)	2																																														7.27
	Takashi ONUMA	Sub-Team Leader/Water Quality Monitoring	3																																														10.20
	Yoshiki YAMAMOTO	Simulation Model Analysis	3																																														4.47
	Hiroshi NAKANO	Pollution Source Inventory (PSI) /Pollution Source Control Measures-1 (Industrial Waste Water)	4																																														11.33
	Kengo NAGANUMA	Inspection Technology	3																																														4.87
	Yosuke HORIE	Pollution Load Analysis	4																																														7.30
	Yosuke KAWAMOTO	Pollution Source Control Measures-2 (Domestic Wastewater)	4																																														4.00
	Masakazu MIYAGI	Water Resource Management	4																																														4.87
	Takayasu OTAKE	Administrative and Financial Institution Building	3																																														5.47
	Keiichi TAKAHASHI	Data Management-1/Information Disclosure and Public Awareness	3																																															4.20
	Kentaro YAMAMOTO	Data Management-2/ Coordination	6																																															3.67
																																																	in Vietnam	73.62

	Name	Position	格付	2015 12	2016 1	2016 2	2016 3	2016 4	2016 5	2016 6	2016 7	2016 8	2016 9	2016 10	2016 11	2016 12	2017 1	2017 2	2017 3	2017 4	2017 5	2017 6	2017 7	2017 8	2017 9	2017 10	2017 11	2017 12	2018 1	2018 2	2018 3	2018 4	2018 5	2018 6	2018 7	2018 8	2018 9	2018 10	2018 11	2018 12	2018 1	2018 2	2018 3	2018 4	2018 5	2018 6	2018 10	2018 11	2018 12	Total MM
In Japan	Yoichi IWAI	Team Leader/River Basin Water Environmental Management/Water Environmental Policy (including Environmental Compensation)	2																																														0.10
	Kengo NAGANUMA	Team Leader/River Basin Water Environmental Management/Water Environmental Policy (including Environmental Compensation)	2																																														0.10
	Takashi ONUMA	Sub-Team Leader/Water Quality Monitoring	3																																															0.10
	Yoshiki YAMAMOTO	Simulation Model Analysis	3																																															1.60
	Yosuke HORIE	Pollution Load Analysis	4																																															1.60
	Kentaro YAMAMOTO	Data Management-2/ Coordination	6																																															0.20
																																																	ln Vietnam	3.70

	2015 12	2016 1	2016 2	2016 3	2016 4	2016 5	2016 6	2016 7	2016 8	2016 9	2016 10	2016 11	2016 12	2017 1	2017 2	2017 3	2017 4	2017 5	2017 6	2017 7	2017 8	2017 9	2017 10	2017 11	2017 12	2018 1	2018 2	2018 3	2018 4	2018 5	2018 6	2018 7	2018 8	2018 9	2018 10	2018 11	2018 12	2018 1	2018 2	2018 3	2018 4	2018 5	2018 6	2018 10	2018 11	2018 12
Reports	▲ 業務計画書			▲ ICR			▼ MS1						▼ MS2				▲ PR		▼ MS3						▼ MS4						▼ MS5						▼ MS6				▲ DFR		▲ FR			

	Grand Total	77.32

Source: JET

3. Project Management Activities

3.1 Joint Coordination Committee (JCC)

JCC meetings were held 5 times to report progress and results of the Project and to discuss issues of planned/implemented activities as shown in Table 3-1 to Table 3-5, and the Minutes of Meeting (M/M) are in Attachment 4 of this report.

Table 3-1 Discussion Results of the 1st JCC

No./Date	1st JCC Meeting (22/March/2016: Crowne Plaza)
Theme	To discuss and approve the contents of the Inception Report (IC/R), including the work plan 2016, Project Implementation Structure, PPs activities, and Capacity Development (CD) Plan To confirm the development process of legal documents To confirm the detail PPs activities

Major Comments & Requests	**Actions of Vietnamese side and JET**
1) All JCC members confirmed their agreement on the work plans for project activities in 2016 – 2018, the organization structure of the project, PPs activities, general contents of target legal documents, and supporting tools that are described in the IC/R. Referring to this decision, both sides agreed to officially start project activities.	1) Vietnamese side and JET include JCC members implement the Project activities and continuously communicate/ update about the Project activities.
2) It was confirmed that the Project document was signed by the Minister of MONRE on 22nd Mar. 2016.	2) Further decisions of MONRE on the establishment of JCC and PMU with specific obligations would be done at the soonest so that the target PCCs could have quick responses on the assignment of their members to JCC and PMU as well as in time arrangement of co-financing for project activities.
3) 6 circulars are important and is hard to develop; however, its contents are very important for the effectiveness in implementation for river basin water environmental management.	3) In the period of the Project implementation, the rearrangement of development of priority target circulars could be considered annually in accordance with the plan of MONRE but some proposed circulars, such as pollution load capacity and information sharing should be included in the MONRE's plan for development of legal documents in 2017.
4) The Project should consider to cooperate and technical support to Center for Environmental Information and Data (CEID) for the further development of the "Circular on development of report on environmental protection works, announcement and providing environmental information, and statistic Indicator System on report on environment" as well as some relevant activities such as conference, consulting workshop.	4) The Project is requested to clarify the content of the circular currently developed by CEID, the relation between the Circular on information sharing proposed in the Project and the one led by CEID, and if any difference, how the Project would deliver its Output on legal document for information sharing.
5) PPs and CD activities are highly appreciated and Cau river basin is looking for those CD activities for its chance to study experiences of Dong Nai river basin.	5) The Project is requested to accelerate its implementation for the PPs activities to timely generate the results which is reflected into draft Circulars.

Source: M/M of 1st JCC

Table 3-2 Discussion Results of 2nd JCC Meeting

No./Date	2nd JCC meeting (1/Dec/2016: Crowne Plaza)
Theme	- To announce of Decision No. 2652/QĐ-BTNMT on the establishment of JCC; - To summarize on the progress of project and encountered issues; - To summarize on the activity plan and expected outputs/outcomes.

Major Comments & Requests	**Actions of Vietnamese side and JET**
1) The Decision No. 2652/QD-BTNMT by the Minister of MONRE on the establishment of JCC of the Project for Strengthening Capacity of WEMRB was issued 15th November 2016.	1) PMU was requested to report leaders of MONRE and relevant Departments for providing instructions to target DONREs in proposing and utilizing their co-financing budgets.
2) JCC members agreed that the Project was targeting the most challenging areas in RBWEM via development activities of legal document, PPs implementation in the target river basins, and CD activities.	2) Vietnamese side and JET agreed to accelerate the progress. In the course of the project, the activities of the project can be adjusted accordingly. These matters need to be implemented through the joint efforts and discussions by both sides.
3) JCC members agreed that the target circulars were indeed useful for water environmental management in river basins and had to be added into the Legal Document Development Program of MONRE.	3) VEA is requested to work with DWRM and the DOL/MONRE so as to submit the list of proposed legal documents to MONRE. Moreover, the target Circulars 2 & 3 should be nominated to the Legal Document Development Program of MONRE in 2017. Other circulars described in the PDM should also be considered to nominate into the preparation and promulgation plan of MONRE in 2017 or 2018.
4) The Circular-5 obtained major achievements as the final draft was uploaded to the MONRE website.	4) Both sides would make efforts to develop the Circular-6. The Circular-5 and Circular-6 is developed jointly as the Decree instead of the Circulars.
5) The training course should be considered to adjust the contents and reprogram to increase its effectiveness for CD for local provinces.	5) Both sides agreed that the contents of trainings for CD for target DONREs would be adjusted
6) MONRE has submitted the draft Decision on establishing River Basin Management Committees to the competent authority; the function on water environmental management is included in this Decision.	6) In the coming time, the Project would consider supporting the deployment of this Decision.
7) Project activities shall be monitored and evaluated closely by both sides.	7) Activities should be recorded by photos, result reports, etc., which can be used to share project outcomes and to support audit works.
8) Japanese side has proposed that the next JCC meeting is held in March or April, 2017 for discussing and modifying the project framework if necessary. Vietnamese side understands this importance and agrees to organize next JCC meeting.	8) Both sides would prepare for next JCC meeting.

Source: Meeting Minutes of 2nd JCC

Table 3-3 Discussion Results of 3rd JCC Meeting

No./Date	3rd JCC meeting (21/Apr/2017: Novotel)	
Theme	- To present progress of the Project - To propose activities, form May 2017 - To recommend actions to implement the Project more smoothly	
Major Comments & Requests		**Actions of Vietnamese side and JET**
1) The Steering Committee confirmed activities implemented and outcomes by the Project. The outcomes of the Project were noted as important for river basin management and needs to be tangible and sustainable.		1) Both sides would continue the project activities for formulating tangible and sustainable outcomes by the end of the Project.
2) PMU was requested to proceed the administrative procedure for listing of the Circulars etc. as regulations to be enforced by MONRE, and finalized by the end of September 2017.		2) PMU would take required actions for listing of the Circulars etc. as regulations to be enforced by MONRE.
3) Hereafter, outcomes of the Project is arisen more than so far. Therefore, reporting of Project progress to Steering Committee has to be frequently.		3) Both sides would communicate with the Steering Committee closely same as so far.
4) Coordination for developing Circular-2 between VEA and DWRM has to be enhanced.		4) VEA and DWRM would have meeting for coordinating the actions concerning development of Circular-2.
5) The Steering Committee agreed the proposed contents on revising of PDM.		5) Both sides would sign on the PDM version 02.
6) Project implementation plan in 2017 needs to be approved as soon as possible.		6) PMU would take the required actions for obtaining approval.
7) The Advanced Training Program needs to be finalized with reflecting requests from Vietnamese side.		7) JET would finalize the Advanced Training Program.

Source: Meeting Minutes of 3rd JCC

Table 3-4 Discussion Results of 4th JCC Meeting

No./Date	4th JCC meeting (10/May/2018: Crowne Plaza)	
Theme	- To review and confirm the project progress; - To discuss and confirm the circular development direction; - To discuss and confirm the Action Plan in coming time (Output 3 activities) - To discuss and confirm the amendment of the project (outputs, PDM, and Project period extension).	
Major Comments & Requests		**Actions of Vietnamese side and JET**
1) JCC members reviewed and confirmed the progress of the project, which comprise the actual implementation, the outputs/outcomes regarding the development of draft legal documents, the valuable impacts of training courses as well as the public awareness in frame of Project		1) Both sides would continue the project activities for developing effective outputs/outcomes.
2) JCC members confirmed that the project's contributions to the water environmental management in river basin (RBWEM) are important and valuable, and Efforts of PMU and JET in successful development of project's almost outputs are well recognized. The project's contents, structure, and actual implementation were well defined and presented. This type of project design should be extended in the post-project phase and in other cooperation project in the future. After promulgation of Circular No. 76/2017/TT-BTNMT on Assessment of Wastewater Receiving Capacity and Loading Capacity of Rivers and Lakes, the amended Decree No. 03/2015/ND-CP on Providing Assessment of Environmental Damage, and other documents, the Project outputs is utilized at a larger scale.		2) Technical support from the Japanese experts in remaining duration of the project are essential in promoting for VEA and target DONREs on RBWEM.
Major Comments & Requests		**Actions of Vietnamese side and JET**

3) The titles of six main legislative documents prepared under Output-1 are: Circular-1: Technical Report or Guideline on proposal for coordination mechanism for RBWEM. Circular 2:1) Contributed parts in the Circular No. 76/2017/TT-BTNMT; 2) Technical Guideline for calculating loading capacity - to be issued under one Decision by Vietnam Environment Administration (VEA) in 2018. Circular-3:1) Draft Circular on main wastewater discharge sources for RBWEM, 2) Manual on WDSI for RBWEM - to be issued under one Decision by VEA in 2018. Circular-4: Draft Guideline/Mechanism on data and information sharing for loading capacity calculation and wastewater discharge sources inventory development. VEA would report to MONRE leaders for getting direction on type of document to be issued. Circulars 5 and 6: integrated into a draft decree that amends and supplement the Decree No. 03/2015/ND-CP on Providing Assessment of Environmental Damage - the ESI to request VEA and MONRE to submit the proposal to the Vietnamese Government for listing this document in the promulgation plan in 2019.	3) Both sides would continue to update PDM based on the discussion especially the Vietnamese side would take care of these legal document development procedures.
4) The developed concepts and structures of the Action Plan and the Overall Plan are highly appreciated. The Action Plans should propose actions to be implemented in the future in a detailed manner to support for the successful establishment of unified methodologies for information and data collection and input at river basin level; the selection of coefficients in simulation model; the reduction of pollution load at river basin level; and the allocation of loading capacity by each province.	4) In order to ensure project's sustainability, the Action Plan and the Overall Plan would provide detailed actions to be implemented in post-project phase. Because the existing Environmental Protection Committees in river basin does not have strong coordination mechanisms, the Action Plan and the Overall Plan supported by the Project would contribute the information exchange and collection among provinces.
5) Given an excellent quality, the Technical Guideline for calculating loading capacity and the Manual on wastewater discharge source inventory (WDSI) for RBWEM are now under the issuing stage by the decision of Director General of VEA.	5) Vietnamese side should proceed to issue the Technical Guidelines and the Manual as the decision of Director General of VEA.
6) JCC members agreed with the proposal of extension of Project closing date to 29th May 2019 and the amended Project's contents.	6) JCC members requests that both the Vietnamese side and the Japanese side should report to its own management authority (MONRE and JICA, respectively) regarding this necessity of amendment of Project's contents and both sides shall conduct necessary administrative procedure for the amendment of project contents.

Source: Meeting Minutes of 4th JCC

Table 3-5 Discussion Results of 5th (Final) JCC Meeting

No./Date	Final (5th) JCC meeting (11/April/2019: Crowne Plaza)
Theme	- To review the activities, outputs and results of the project, and confirm outcomes of the project - To confirm the final draft Project Completion Report; To discuss on the finalization of the project activities as well as the necessary and important action after the project.

Major Comments & Requests	**Actions of Vietnamese side and JET**
1) JCC members reviewed the conducted activities and highly appreciated the results of project that achieved the Project Matrix Development (PDM). All members confirmed and endorsed the obtainment of outputs.	1) None
2) JCC members and participants also acknowledged the realizable outcomes of the pilot activities those supported the strengthening of capacities (knowledge and skills) of target Departments of Natural Resources and Environment (DONREs) in the field of water environmental management in river basin. 1)	2) None
3) The JCC members appreciated the published training material.	3) None
4) Structure and contents of the final draft Project Completion Report (PCR) were shared with JCC members in the meeting. JCC members have no objection on that report. The JCC required the JICA Expert Team to continue to finalize the content of the report and send it to the VEA through the JICA Vietnam Office.	4) JET was finalized PCR.
5) Both sides confirmed that the outcomes of the project can be significantly contributed to the water environmental management in river basin in Vietnam. The DONREs strongly recommended MONRE to refer to the contents of draft legislative documents of project in its works of revision of the Law on Environment Protection 2014 as well as other sub-Law regulations regarding water environmental management in river basin.	5) MONRE/VEA is expected to conduct required actions.
6) Based on the above discussion contents, the JCC members suggested to both sides to continue to implement a pilot project at other river basins by the manner developed in the project.	6) A new pilot project would be planned by MONRE/VEA.

Source: Meeting Minutes of 5th JCC

3.2 Project Management Unit (PMU) Meeting

The project conducted PMU Meetings to share the project progress and discuss the schedules and solution for the facing difficulties during JET and Counterpart (C/P), from the beginning of the project. The following table shows that PMU Meetings held by the project.

Table 3-6 PMU Meetings

No.	Date	Topics	Results
1	Jan. 08, 2016	(1) To kick off PMU meeting with JET, (2) To discuss for the development of Draft Work Plan	a) Vietnamese side basically agreed with objectives, structure, main activities of the project.
2	Jan. 21, 2016	(1) To discuss for development of Draft Work Plan, (2) To discuss the demarcation of Circular, (3) Development (between VN side and JET) and PPs activity contents	a) Vietnamese side confirmed main direction for developing Work Plan and IC/R, b) At least 1 circular for environmental compensation planned to be submitted in June 2016 as the final draft.
3	Jan. 28, 2016	(1) To report on project progress with Dr. Dong, DDG of VEA	a) PMU would prepare the necessary document for JCC Meeting on March 2016, b) Related DONREs had been informed to prepare for the project.
4	Feb. 18, 2016	(1) To discuss project progress and next steps,	a) Progress of legal review for environmental compensation was confirmed.
5	Mar. 17, 2016	(1) To discuss preparation & content of the 1st JCC Meeting and WS.	a) Logistic arrangement, the meeting agenda/contents, and the presentation materials were confirmed.
6	Apr. 06, 2016	(1) To report results of DONREs visit.	a) The comments from DONREs to the establishment of TF and WG, and the contents of PPs were shared.
7	Apr. 19, 2016	(1) To report progress of PPs activities, (2) To discuss the plan for the 1st Training in Japan.	a) The progress of the discussion with subcontractors was confirmed, b) Participation of JCC members to the 1st training in Japan was strongly recommended.
8	May 18, 2016	(1) To inform and request nomination of TF and WG members for initial Capacity Assessment, (2) To discuss about development of pollution load analysis and simulation model, including result of Technical meeting on simulation model, (3) To discuss plan for the 1st Training in Japan, (4) To discuss development plan of Circular-4, including collaboration with CEID.	a) PMU understood and would encouraged related organization to nominate TF and WG members, b) PMU understood the results of technical meeting on simulation model, c) JET and PMU would continuously find the opportunity for the collaboration with CEID for the development of Circular-4.
9	Jun. 15, 2016	(1) To inform the official establishment of the PMU and report the progress of the project to New PMU leader, Dr. Mai Thanh Dung.	a) Regarding the clarification of functions of WG and TF in the project activities, the Project would continuously explain and facilitate further to the provinces via actual activities.
10	Jun. 22, 2016	(1) To develop the 1st Monitoring Sheet, (2) To follow up the IWRM issue.	a) Draft documents of the 1st monitoring sheet was distributed to PMU(VEA) and DONREs, but comments from DONREs was reflected to the next monitoring sheet, b) The development of similar circular (Circular No. 02/2009) had been suspended with some matters, but the project would continuously follow up.
11	Aug. 03, 2016	(1) To discuss TOR for subcontract work (Pollution load) and technical WS for sharing the technical experience, (2) To discuss technical training plans,	a) Workshops on environmental compensation was held in August or September, b) JET was requested to develop training program based on level/priority of knowledge and skills.

No.	Date	Topics	Results
		(3) To discuss participants of the 1st Study Tour.	
12	Aug. 17, 2016	(1) To discuss the Overall Training Program and training plan, (2) To discuss objectives/topics and arrangement for the 1st Study Tour and TF Meeting in Dong Nai river basin, (3) To report progress of legal review works.	a) Schedule, content of training program and study tour were agreeable, b) TF meeting in Binh Duong Province was agreeable, c) WENID would nominate members of DONREs in Cau river basin, which are not in the pilot project areas.
13	Sep. 01, 2016	(1) To finalize agenda of the 1st Study Tour and TF meeting in Dong Nai river basin.	a) JET agreed to invite two officers from each Bac Kan, Hai Duong DONREs to the Study Tour.
14	Sep. 14, 2016	(1) To wrap up the 1st Study Tour and TF Meeting in Dong Nai river basin, (2) To discuss agenda and arrangement for TF Meeting in Cau river basin.	a) The agenda of TF Meeting in Cau river basin was confirmed.
15	Sep. 23, 2016	(1) To finalize presentation for TF Meeting in Cau river basin, (2) To discuss progress of legal review works with draft reports.	a) The presentation contents in TF Meeting in Cau river basin were almost confirmed, b) PMU and JET confirmed to promote the legal review works.
16	Oct. 28, 2016	(1) To discuss expected schedule on the 2nd TF Meetings in both RBs, (2) To discuss progress of legal review works and Pilot Project activities.	a) The modification of the project outputs on circular or decree development could be discussed in JCC meeting on March 2017.
17	Nov. 08, 2016	(1) To discuss the development of training activities, (2) To discuss possibility of holding Joint WS with World Bank (WB) project and the 2nd JCC Meeting.	a) Contents and schedule of basic training activities in November were approved by VEA leaders, b) WENID would continue to collect comments from VEA, other DONREs concerning training activities and share to JET for further improvement of training activities, c) Joint WS with WB project would be held in January 2017.
18	Nov. 16, 2016	(1) To discuss necessary process for Circular development, especially for Circular-2 and Circular-3, (2) To discuss the organization of the 2nd JCC and 2nd TF Meetings in both RBs.	a) Technical contents which could be included into Decree should be recommended by Vietnam side, b) JET would closely coordinate with WENID to develop Circular-2 and Circular-3, c) Timing for JCC meeting and TF meeting should be flexible depending on available time of Mr. Vo Tuan Nhan.
19	Dec. 13, 2016	(1) To wrap up JCC meeting and discuss further required actions based on the result of JCC meeting, (2) To report progress of examination of Circular-2 and Circular-3, and discuss on work schedule in January, (3) To discuss on time and contents of the 2nd TF Meetings in both RBs.	a) C/Ps would check and confirm the JCC meeting Minutes, b) JET would consider to hire national experts for participating in and supporting technical meetings and trainings, c) The 2nd TF meeting would be held in March 2017 tentatively.
20	Jan. 17, 2017	(1) To report progress of examination of Circular-2 and Circular-3, (2) To discuss Circular-1 and Circular-4 contents (3) To confirm the Monitoring Sheet,	a) JET would reflect comments from PMU to Monitoring sheet, b) Draft framework for Circular-1 and Circular-4 would be prepared in April or May, 2017.

No.	Date	Topics	Results
		(4) To discuss on time and content of the 2nd TF meeting and JCC meeting, (5) To discuss on project schedule in February and March, 2017.	
21	Feb. 23, 2017	(1) To report progress of examination of Circular-2 and Circular-3, (2) To report on result of pilot activities.	a) JET and PMU would prepare TF meeting, b) For Circular-2 and Circular-3 preparation, technical meetings would be planned and implemented.
22	Mar. 15, 2017	(1) To report progress of examination of Circulars, (2) To report progress of PPs and results, (3) To discuss on arrangement of the 2nd TF meetings, (4) To discuss on training in Japan, (5) To discuss on the 3rd JCC meeting.	a) Based on the discussion, all DONREs would be invited for the training in Japan, b) After JCC meeting, a Workshop for IWRM planned to be organized.
23	Mar. 29, 2017	(1) To discuss on finalizing of the 1st draft of Circular-2 and Circular-3, (2) To provide schedule of PPs after April 2017, (3) To discuss on JCC meeting and IWRM Workshop.	a) JET would calculate loading capacity and estimate science-based discharge quota by the end of May, b) JET was planning to conduct ATC. It should contribute to increase the feasibility of proposed circulars.
24	Apr. 18, 2017	(1) To discuss on the progress of the draft Circular-2 and Circular-3, (2) To discuss on the JCC meeting, (3) To discuss on IWRM Workshop, (4) To confirm the activity schedule in April and May.	a) PMU and JET agreed to distribute the 1st draft Circular-2 and Circular-3 in the 3rd JCC meeting and to distribute to all concerned DONREs, b) For preparing detail plan of ATC, JET would have meeting with each DONRE.
25	May 12, 2017	(1) To confirm the results of the 3rd JCC meeting, (2) To report results of DONRE visit, (3) To confirm the Advanced Training Course in 2017, (4) To confirm the activity schedule in May and June, (5) To confirm the preparation of training in Japan.	a) Mr. Hoang Van Thuc was officially assigned as new Project Director and reviewed progress of ongoing activities, b) Both sides confirmed results of the 3rd JCC meeting and DONRE visits, c) Advance Training Course was generally agreed. Detailed documents and materials was sent to VEA and DONREs for preparing official letter and assigning appropriate trainees.
26	May 18, 2017	Upon request from Mr. Hoang Van Thuc, PMU Director, JET reported and presented PPs progress, including the following important topics: 1. Pollution Load Analysis, 2. Loading Capacity Calculation, 3. Science-based Discharge Quota Allocation, 4. WDSI Development	a) Mr. Hoang Van Thuc appreciated efforts of JET and agreed with project's approach, b) Both sides acknowledged difficulties in conducting technical activities, c) Both sides agreed to continuously discuss technical and administrative matters for finding and implementing solutions/measures.

No.	Date	Topics	Results
27	May 31, 2017	(1) To confirm circular development process after June 2017, (2) To confirm Advance Training Course in 2017, (3) To discuss TF meeting and technical meeting, (4) To discuss approach for preparing Output-3, (5) To discuss Monitoring Sheet-3, (6) To prepare progress report preparation.	a) Circular 2 and Circular-3 would be improved further, especially appendixes. Technical Guideline was checked and discussed before sharing with TF members, b) Meeting on Circular -4 development and Circular-5, 6 finalizations would be conducted, c) Both sides confirmed the organization of ATC. The structure of the course should be flexible and reflect evaluations from trainees in previous sessions, d) Contents of TF and technical meeting were generally agreed, e) Monitoring Sheet 3 was agreed by Vietnamese side.
28	Jun.21, 2017	(1) To confirm circular development situation, (2) To confirm Advance Training Course in 2017, (3) To confirm presentation contents on TF meeting and technical meeting, (4) To discuss approach for preparing Output-3.	a) Circular -2 would be improved and discussed further between both sides, b) Circular-3 would be discussed in detail after JET checks output of national expert, c) Circular-4 would be developed as Guidelines. JET and WENID would have a meeting to discuss in detail about content requirements, d) ATC should be designed and conducted in a flexible manner, e) The concept of Output-3 would be shared with targeted DONREs in TF meetings.
29	Jul.18, 2017	(1) To confirm circular development situation, (2) To confirm Advance Training Course in August 2017, (3) To confirm progress of awareness raising PPs, (4) To discuss approach for preparing Output-3, (5) To discuss the 2nd Study Tour Program.	a) JET shared reply to comments to Circular-2 and Circular-3 in Technical and TF meeting, b) Both sides confirmed further schedule for finalizing Circular- 2 and Circular -3, c) Both sides confirmed to conduct ATC in August as planned, d) Vietnamese side appreciated and agreed with progress of awareness raising PPs.
30	Aug.17, 2017	(1) To confirm circular development situation, (2) To confirm Advance Training Course, Schedule in August and September 2017, (3) To confirm progress of awareness raising PPs, (4) To discuss approach for preparing Output-3.	a) Vietnamese side would review and discuss in detail about approach on Circular-1 development proposed by JET, b) Draft contents of Circular-6 were developed, c) PMU would report ATC 1-1 (3) to VEA leader and prepare official document to JET soon. PMU agreed to invite trainees from Thai Nguyen and Bac Giang DONRE to present obtained skills through ATC at the 4th TF meeting, d) Vietnamese side appreciated and agreed with progress of awareness raising PPs, e) Both sides confirmed program of the 2nd Study Tour and TF meeting.
31	Sep.06, 2017	(1) To confirm schedule for finalizing Circular-2 and Circular-3, retreat meeting for finalizing the Technical Guideline on Calculation of Loading Capacity and Discharge Quota,	a) Both sides discussed and confirmed program of retreat meeting for finalizing Technical Guideline, b) Wrap-up meeting on TF and technical meeting results with Mr. Hoang Van Thuc would be confirmed later,

No.	Date	Topics	Results
		(2) To confirm schedule of ATC, (3) To confirm program of the 4th TF meeting and the 2nd Study Tour, (4) To confirm progress of awareness raising PPs.	c) Vietnamese side appreciated outcomes of the 1st awareness event and agreed with program of the 2nd event, d) Signature of Vietnamese side on the Minutes of the 3rd JCC meeting was discussed.
32	Oct.12, 2017	(1) To confirm circular development situation, (2) To report progress of awareness raising PPs, (3) To discuss approach for preparing Output-3, (4) To update River Basin Organization (RBO) development situation, and (5) To discuss about process of visa application.	a) Circular - 2, Circular-3 and Technical Guideline shall be updated further and reflected comments from TF meetings, technical meeting, etc. and sent to VEA for further consideration. Technical points should be analyzed and presented more carefully and specifically, b) The third environmental awareness activity would be organized in Bac Giang Specialized High School on October 20th, 2017.
33	Nov.02, 2017	(1) To confirm finalization process of Circular-2 and Circular – 3, (2) To confirm Circular-1 and Circular-4 contents development, (3) To report progress of awareness raising PPs, (4) To discuss on approach for preparing Output-3, and TF meeting.	a) Draft Circular-2 with Technical Guideline, Circular-3 and Action Plan should be presented at upcoming WS, b) JET would continuously finalize Circular-2 with its Guideline, Circular-3, and Action Plan to be approved at the 5th TF meeting, c) Circular-1 and Circular - 4 were agreed to developed as Guidelines. d) To fix the date of JCC, PMU requested JICA HQ to issue an official letter., e) Awareness raising PPs were completed. A final report would be reviewed within 2017.
34	Nov.28, 2017	(1) To confirm Workshop organization (Date, Objectives and expected outcome) and JICA HQ mission, (2) To confirm Circular-4 contents development, (3) To discuss draft contents of the Action Plan, (4) To discuss approach for preparing Output-3, and TF meeting.	a) Date, objectives and expected outcome of the workshop were confirmed by both sides, b) Circular-4 was agreed to develop as a Guideline. WENID was shared TOR and requested to nominate a national expert for supporting this activity, c) Action Plan should reflect DONREs' opinions and is discussed openly at the upcoming TF meeting.
35	Dec.12, 2017	(1) To confirm JICA HQ Mission Schedule, (2) To confirm WS program, Expansion PMU Meeting, (3) To confirm hiring of local expert for Circular-4 development, (4) To discuss on approach for preparing Output-3, and TF Meeting, (5) To close Project Office in Binh Duong Province.	a) JICA HQ Mission Schedule was confirmed, b) WS program should be revised based on comments from PMU. Extended PMU meeting would invite JCC members, c) WENID suggested to have meeting with concerned agencies, such as Center for Environmental Monitoring (CEM) before selecting local expert for Circular-4 development, d) The 5th TF meeting was confirmed to organize in January, 2018, e) Vietnamese side acknowledged that PPs in Southern was completed and Binh Duong Office would be closed within 2017.

No.	Date	Topics	Results
36	Jan. 10, 2018	(1) To wrap-up workshop and expanded PMU meeting, (2) To confirm outcomes in Output-1, (3) To discuss on approach for preparing Output-3, (4) To discuss on preparation of the 5th TF meeting, (5) To discuss on other issues: MOU of vehicle use, and training certificate.	a) Draft discussion record of workshop and extended PMU meeting were distributed. From these records, work plan in 2018 was discussed, b) Both sides agreed schedule of the 5th TF meeting in Cau and Dong Nai river basin, c) The certificates of BTC were prepared. The certificate of ATC and MOU of vehicle use would be reviewed by PMU and finalized later.
37	Jan.31, 2018	(1) To wrap-up TF Meeting (2) To confirm basic direction of circulars development, (3) To discuss on an approach for preparing Output-3, (4) To discuss the preparation of next JCC meeting.	a) Both sides confirmed outcomes of Output-1 – Legal document development, b) Action Plan and Overall Plan would be continued to develop and share with Vietnamese side, c) Both sides tentatively agreed with schedule and content of upcoming JCC meeting.
38	Mar.07, 2018	(1) To discuss on revision of PDM, (2) To confirm basic direction of Circulars development, (3) To discuss on an approach for preparing Output-3, (4) To discuss the preparation of next JCC meeting, (5) To discuss on training in Japan.	a) Basically, Vietnamese side agreed with revisions in the draft PDM (ver. 3.0). This revision should be reported and confirmed at the upcoming JCC meeting. JET would report this matter to JICA HQ and confirm these revisions, b) Circular - 2 was finalized and considered as one of project outcomes (Circular No.76/TT-BTNMT/2017), c) Guideline on Coordination Mechanism (Circular – 1) would be discussed in detail regarding development direction, d) PMU agreed with DONRE visit in March 2018. PMU also proposed to hold river-basin level meeting for confirming Action Plan at river basin level and ensuring the cooperation and coordination among provinces, e) PMU suggested to invite Mr. Hoang Van Thuc to Training in Japan and increase the number of participants to 11 persons, f) Exact date of the upcoming JCC meeting would be confirmed later.
39	Mar.30, 2018	(1) To discuss on further schedule of the Project considering restructuring of MONRE/VEA, (2) To discuss on revision of PDM, (3) To confirm basic direction of legislative documents development, (4) To discuss an approach for preparing Output-3, (5) To discuss preparation of next JCC meeting, (6) To discuss on training in Japan.	a) JICA side proposed to extend project duration to April 2019 in order to ensure sustainability of project outcomes. PMU proposed to extend to October 2019 with sufficient donor budget, b) Both sides agreed on further revision of PDM, c) MONRE was conducting to revise Law on Environmental Protection (LEP) 2014, thus legal documents guiding LEP, such as Decree, would be considered after approval of revised LEP by National Assembly. Detail revision plan was sharing to LET, d) Time of JCC meeting was confirmed on either May 8 or May 10, 2018. Detail content of meeting should be discussed further,

No.	Date	Topics	Results
			e) Training in Japan would be delayed due to changes in VEA's organizational structure. Exact time would be decided after the Project duration would be confirmed.
40	Apr.20, 2018	(1) To discuss on JCC meeting contents (2) To confirm the basic direction of legislative documents development, (3) To confirm the revision of PDM (4) To discuss on an approach for preparing Output-3, (5) To discuss the project period (Half year extension) and the contents	a) The JCC meeting was proposed to be in the afternoon of May 10, 2018. The main objective of JCC meeting was set to ask for JCC members' opinions for further direction of the Project implementation, b) Circular-1 was proposed to be developed as a guideline on coordination mechanism supporting for the implementation of new RBOs, c) The draft Technical Guideline on Loading Capacity Assessment related to Circular-2 would be sent to all relevant agencies in VEA and submitted to VEA managers at the beginning of May, d) Circular-3 as a draft manual on WDSI would be finalized to implement Decision No. 140/QD-TTg, e) VEA would coordinate JET, CEID, and CEM to discuss and finalize as draft guideline on information sharing. Circular-5 and 6 was proposed to be integrated into the amending Degree No. 03. f) PDM contents should be revised for submitting on 24 April 2018. g) PMU and JET agreed to extend the Project period for 6 months due to restructuring of VEA, and change in direction on legislative document development in MONRE. h) Even though after restructuring of VEA, the exiusting PMU would be kept.
41	July 24, 2018	(1) To discuss the further schedule of the Project (JET schedule, PMU member etc.) (2) To discuss on finalizing of Output-1 (3) To discuss on preparation of Overall Plan and Roadmap under Output-3 (4) To discuss on training in Japan (5) To discuss and confirm on 5th monitoring sheet	a) Basically, MONRE and JICA headquarter agreed to extend the Project period for 6 months. b) The type of products under Output-1 was confirmed by the RD of JCC meeting, c) 1st draft of Roadmap was requested to be sent to PMU for review, d) Training in Japan would be conducted in September and October 2018, e) Monitoring sheet would be submitted to JICA Vietnam Office and JICA HQ, f) The Project would publish 500 copies of training material as a book published by MONRE.
42	September 26, 2018	(1) To confirm the project extension issue (2) To discuss the further schedule of the project (3) To discuss on final of Output-1 (4) To discuss on preparation of Overall Plan and Road Map (5) To discuss training in Japan	a) PMU was conducting the project extension application progress to MONRE.LET office would be closed in November due to lack of counterpart fund for renting office, b) A workshop for dissemination of the Project outcomes was planned, c) Outcomes of Output-1 should be finalized in technical report and VEA's decisions as proposed. d) JET should collect comments from DONREs on draft Overall Plan,

No.	Date	Topics	Results
			e) DWRM should be involved in the initial development stage of Road Map, f) List of the Project activities and the current draft result was requested to be shared with PMU for reviewing.
43	October 26, 2018	(1) To confirm the project extension issue (2) To discuss the draft agenda of W/S (3) To discuss activities after the W/S (4) To discuss the situation of the finalization progress of Output1 (5) To discuss the Output-3 activity (River basin management and Road Map)	a) Basically, MONRE agreed to extend 6 months of the project period based on confirmation of M/M of JCC on revision of PMD. b) PMU would discuss how to give a presentation on the workshop, planned on 1st Nov 2018, c) JET would discuss with target DONREs in both Cau and Dong Nai river basin on draft Overall Plan to get their comments after the workshop. PMU would prepare an official letter for DONRE visit.
44	January 22, 2019	(1) To confirm the situation of the finalization process of Output-1 (2) To report on Output-3 activity (Action Plan, Overall Plan, and Road Map) (3) To confirm the preparation schedule of the Project Completion Report (PCR) (4) To discuss about Final JCC and W/S Others: The project extension, RBO, hand over project equipment and MIKE 11 dongles	a) Dr. Hoang Van Thuc, VEA Deputy General Director was assigned to sign the promulgation document for Technical Guideline, b) JET would continue to cooperate and support for implementation of Decision No. 140 with the draft Circular-3 and Technical Manual on WDSI, c) Overall Plan and Road Map would be revised and improved further, with the support from local consultants, d) Draft PCR would be submitted to PMU at the end of January for further updating, e) Final JCC Agenda would be reported to VEA leader and MONRE leader.
45	March 6, 2019	(1) To discuss about Final JCC and W/S (2) To confirm the situation of the finalization process of Output1 (final confirmation) (3) To reports the output-3 activity (Action Plan, Overall Plan, and Road Map) (4) To confirm the Project Completion Report (PCR)	a) Time, venue and agenda of final JCC meeting and Final WS were confirmed, b) VEA's Decision on promulgating Technical Guideline was issued on Feb 27th, c) Action Plan and Overall Plan were discussed with targeted DONREs. ESI would prepare official document attaching these plans to concerned agencies for written comments, d) Road Map would be developed considering the Law on Planning, e) Published training materials was finalized and would be shared at the Final JCC meeting.
46	April 4, 2019	(1) To confirm about Final JCC and W/S (2) To confirm the final outcomes and the necessary issue after the project (3) To reports the Output-3 activity (Action Plan, Overall Plan, and Road Map)	a) Time, venue and agenda of final JCC meeting and Final WS were finalized. b) All outcomes of the Project were confirmed and listed. c) Action Plan and Overall Plan reflected the comments by DONREs were shared with PMU.

Source: JET

PMU meeting is very important occasion for discussing and confirming project contents. The effort put in by Vietnamese C/P and JET contributed to the smooth and effective operation of these PMU meetings. And in some meetings, JICA-Vietnam office staff participated in and important issues were also discussed.

3.3 Task Force (TF) Meeting

The TF meetings were held 6 times, basically by each target basin with gathering each DONRE in same basin in one place. Table 3-7 summarizes all TF meetings of the Project. The discussion results of all TF meetings are in Attachment 5 on this report.

In TF meetings, progress and outcomes of the Project were reported and almost all of important project issues were discussed and confirmed by relevant actors of the Project. These TF meetings strengthened the relationship between MONRE and DONREs, and among DONREs. In this context, the TF meetings had very important rolls to reflect DONRE's opinion to the Project activities and the legislative documents prepared under Output-1.

Table 3-7 Summary of All TF meetings of the Project

No.	Theme & Main Topic with Main Activities	Place
First TF Meetings (September, 2016)	1) To monitor the progress of the WG activities especially subcontract works for target river basin 2) To review and examine PPs activities as an initial stage of the Project (e.g. legal doc review results) 3) To discuss project management issues at initial stage of the Project 4) To discuss implication of preparation process of RBWEM Plan with development of Circulars Main activities: Progress of PPs activities were shared. The draft overall training program was introduced, and discussed with DONREs. Discussion results were reflected the final overall training program.	Each river basin area (Bac Ninh) (Bac Giang)
Second TF Meetings (March, 2017)	1) To review and examine PPs activities as a final timing of 1st year of the Project (e.g. technical outcomes such as manual and guidelines) 2) To have opinion exchange for development Circular-2 & 3 frameworks 3) To facilitate inter-provincial coordination for draft circulars development 4) To conclude lessons and learnt of the project activities for draft circulars development Main activities: Contents of draft Circular-2 and Circular-3 with related PPs activities progress were shared, and discussed on issues to be solved for enhancing inter-provincial cooperation for RBWEM by total pollution load control approach. The discussion results were referred for preparation of the Final draft Circular-2 and Circular-3.	Each river basin area (Dong Nai) (Hanoi)
Third TF Meetings (June, 2017)	1) To review and examine PPs activities related to tentative result of loading capacity calculation and science-based discharge quota allocation 2) To facilitate inter-provincial coordination for draft circulars development 3) To share lessons and learnt of the project activities for draft circulars development obtained through ATC. 4) To discuss on expected outcomes of Output-3 (Action Plan only) Main activities: The progress of the trainings for loading capacity assessment were confirmed, and draft Circulars and relevant legislative documents including the framework of Guideline for Coordination Mechanism and Information Collecting and Sharing, were introduced and discussed to examine their feasibility in both target river basins.	Each river basin area (HCMC) (Hanoi)
Fourth TF Meetings (September, 2017)	1) To show the Final draft of Circular-2 & Technical Guideline, and Final draft of Circular-3 by WENID 2) To show the results of output of PPs activities by TN & BG DONRE 3) To introduce environmental awareness activities as new PPs by BG DONRE	Joint TF (Bac Giang)

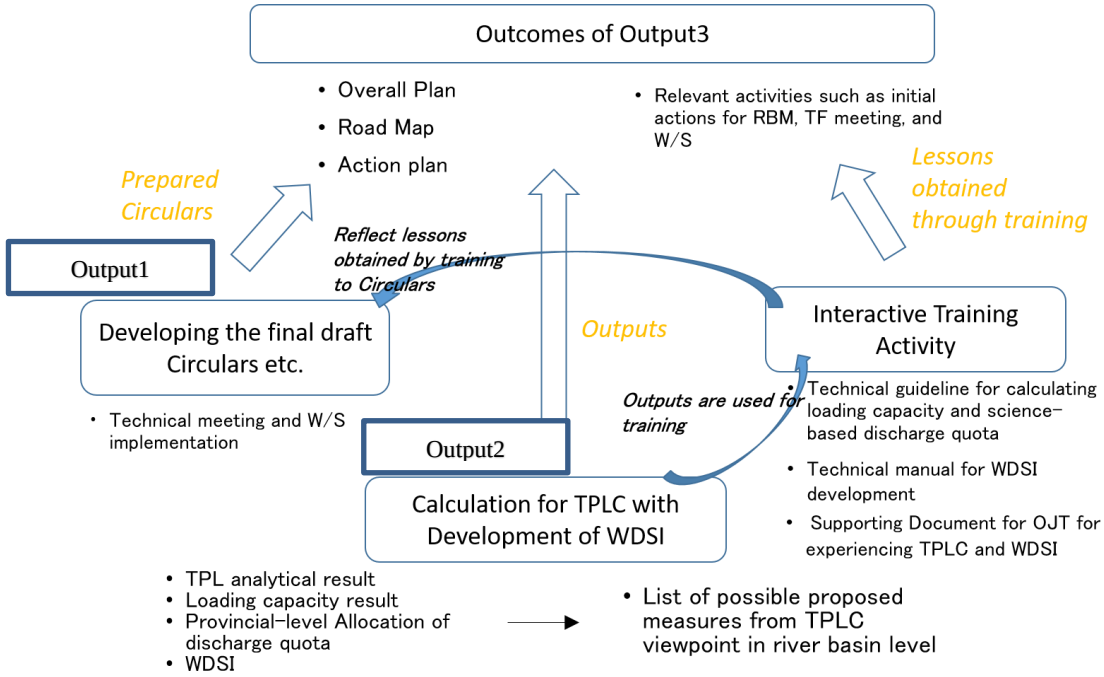
No.	Theme & Main Topic with Main Activities	Place
	4) To discuss a concept of Action Plan (on each river basin) by JET 5) To discuss a concept of Guideline for Circular-1 & Circular-4 by JFT Main activities: This TF meeting was held as unified TF meeting by participating all target DONREs of both target basins in one place. In the meeting, Thai Nguyen DONRE, Bac Giang DONRE, and Binh Duong DONRE presented their trial pollution load analysis and loading capacity assessment results on each provincial water body, based on the skills obtained through ATC.	
Fifth TF Meetings (January, 2018)	1) To discuss progress of Action Plan by JET 2) To show the Final draft of Guideline for Circular-1 & Circular-4 by WENID/ ESI 3) To discuss concept of Overall Plan by JET 4) To conclude BTC & ATC by JFT Main activities: Final outcomes of PPs were shared with target DONREs, and preparation process of Action Plan for allocating science-based loading capacity using PPs calculation process were introduced, and discussed. Each province in same river basin pointed out difficulties to allocate allowable pollution load by each province. The discussed results were referred to finalize Action Plan.	Each river basin area (Hanoi) (BR-VT)
Sixth TF Meetings (May, 2018)	1) To conclude lessons and learn of the project activities by JET 2) To show the Final draft of Action Plan by JET 3) To discuss of Overall Plan by JET Main activities: VEA introduced outcomes under Output-1, and JET introduced concept of Overall Plan and Road Map, and discussed with target DONREs. Each target province discussed actions to be taken for RBWEM in inter-provincial river basin. Discussed results were referred to finalize Overall Plan and Road Map.	Joint TF (Hanoi)

Source: JET

3.4 Capacity Development and the Activities

Capacity Development (CD) is main part of this project. PMU, TF and JCC were organized as the implementation structure of the project. Each CD activity's planning and implementation were confirmed by PMU and TF, and the results were shared with JCC.

And, in the Project, CD activities were mainly conducted by the trainings provided under Output-1, 2 and 3. Each training activity is described in the Section 4.3, 5.2 and 6.2 by each Output of the Project. At the same time, through the implementation of CD, the contents and the results were reflected to each output. This function and relationship between CD and other matters is shown as Figure 3-1



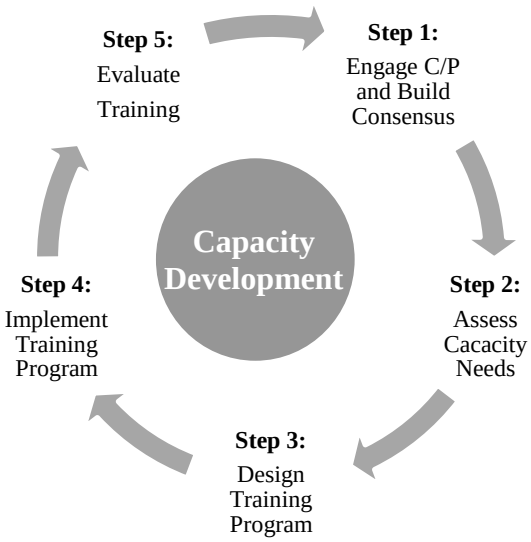
Source: JET

Figure 3-1 Relationship between CD and Other Project Components

3.4.1 Implementation Cycle of Capacity Development (CD)

As mentioned above, CD was one of the important activity of the Project. Because it was considered that CD for policy development and enforcement was the key factor to develop a system for RBWEM in Vietnam with resolving the existing issues, and to conduct RBWEM effectively and sustainably. The CD activities of the Project aimed at covering 2 main contents: development of relevant legal documents for RBWEM, and training activities to improve the capacity on implementation of total pollution load control approach by the central and local governments.

And the effectiveness of CD in the Project was evaluated by 5 steps in the CD cycle below.



Source: JET

Figure 3-2 Project CD Cycle

CD cycle was applied in developing training activities in the Project. An important point in this cycle was the implementation of initial capacity assessment survey (Step 2), as well as assessing the effectiveness of the training program implemented (Step 5). Step 1 in this cycle is to reach agreement between C/P and JET on the content and implementation of capacity building in RBWEM. After the main contents were approved by MONRE, DONRE, and JET, the initial capacities of managers and technicians in VEA and DONREs were assessed (Step 2). The results of this initial capacity assessment were used to design overall training program, in accordance with the CD requirements of C/P (Step 3). JET, in conjunction with Vietnamese experts, and VEA, organized a basic and advanced training program on policy development and implementation of RBWEM policy with total pollution load control approach for staffs in VEA and targeted DONREs (Step 4). After each training session, a questionnaire was given to participants to grasp the participants' ideas on the training contents, and to find out the issues that need to be addressed (Step 5) for 1) developing next phase training program, and 2) reflecting the actual requirements of the state management officials into the legal documents developing in the Project.

3.4.2 Conducting Capacity Assessment

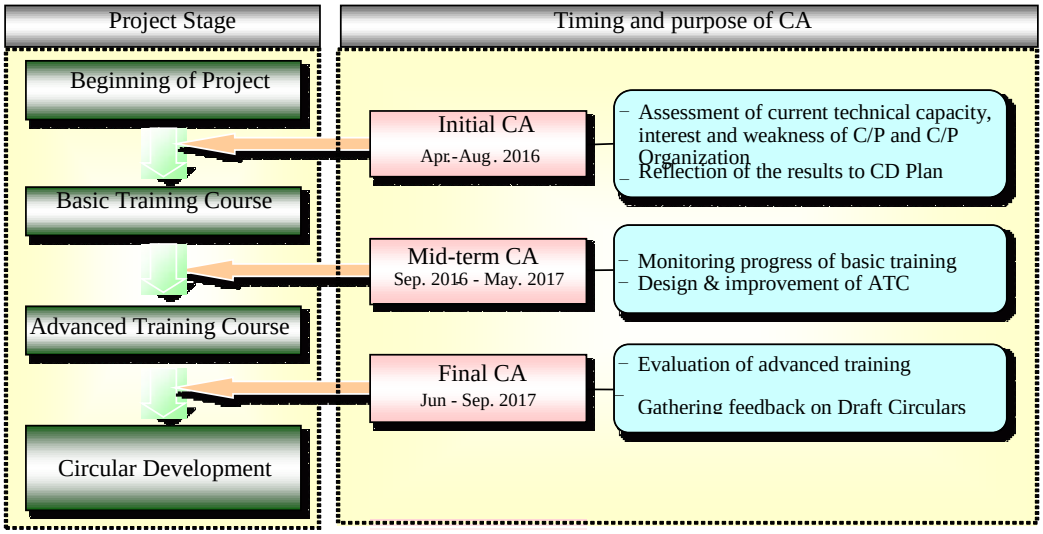
The progress of CD was evaluated by a set of capacity assessment (CA). CA helped to find out the gaps between current capacity and capacity needs, and to propose necessary training and content development for RBWEM. The methodology of CA was quantitative survey with qualitative questionnaires, and Q&A at direct meetings with trainees to gather feedback and opinions from representatives of each organization.

The evaluation of the CD program is carried out in the 3 phases of the Project:

- The first time: The initial phase of implementing the Project
- The second time: The end of Basic Training Course (BTC)
- The third time: The end of Advance Training Course (ATC)

The initial CA aimed at confirming the initial capacity status, and was used as a reference to assess the effectiveness and efficiency of trainings to achieve the goals in CD. The mid-term CA was conducted in the middle of the Project, with the main content being the evaluation of the BTC Program, to evaluate the trainees' ideas on relevance and effectiveness of the training contents for trainees' regular work, and to propose required capacity building activities in the second half of the Project. The final CA was conducted at the end of the ATC program. The objective of this final assessment was to evaluate the results of the ATC Program and to reflect the actual internal issues found through the training, such as lack of available water flow data, or requirement of WDSI, to the legislative documents developed and finalized under Output-1 in the Project (Figure 3-3 Timing and Purposes of Capacity Assessment Survey

3).



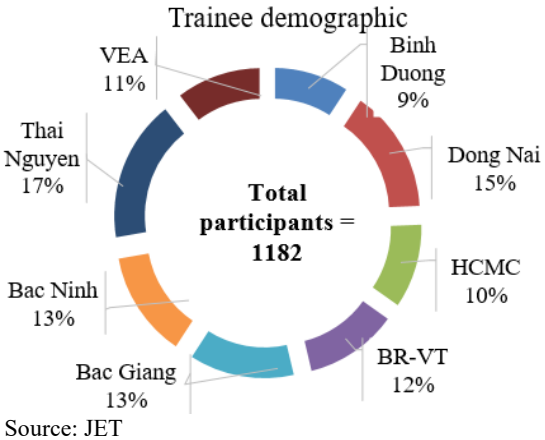
Source: JET

Figure 3-3 Timing and Purposes of Capacity Assessment Survey

3.4.3 Scope of Capacity Development (CD)

The scope of CD in the Project covered all level, from individual to organizational capacity, and national level by supporting policy development.

For individual and organizational capacity building, overall training program was designed with participation from MONRE/VEA, and target DONREs. The core group was the working group established at the beginning of the Project. This group comprises of managers and technical staffs at EPA, CEM, Division of Water Resources in each DONRE. Totally, 1,182 trainees participated in the training classes from central government to provincial and local DONREs (Figure 3-4 Training Participants 4).



Source: JET

Figure 3-4 Training Participants

3.4.4 Initial Capacity Assessment (CA)

(1) Outline of Initial CA

The initial capacity assessment was conducted at the beginning of the Project, from January to September 2016. Manager class and technical staffs of MONRE/VEA, and 7 target provincial

DONREs were invited to answer a set of questionnaires. 88 respondents participated in the survey, of which, approximately 60% respondents were management class, and approximately 40% were technical staffs. The questions covered various aspects such as institutional aspect, organizational aspects, technical aspects, human resources, and financial resources for feasible management. Questions also related to CD of the following main areas related to legislative documents developed under Output-1 of the Project:

1, Coordination mechanism

2, Assessment of loading capacity and RBWEM roadmap development

3, Main wastewater discharge source inventory development

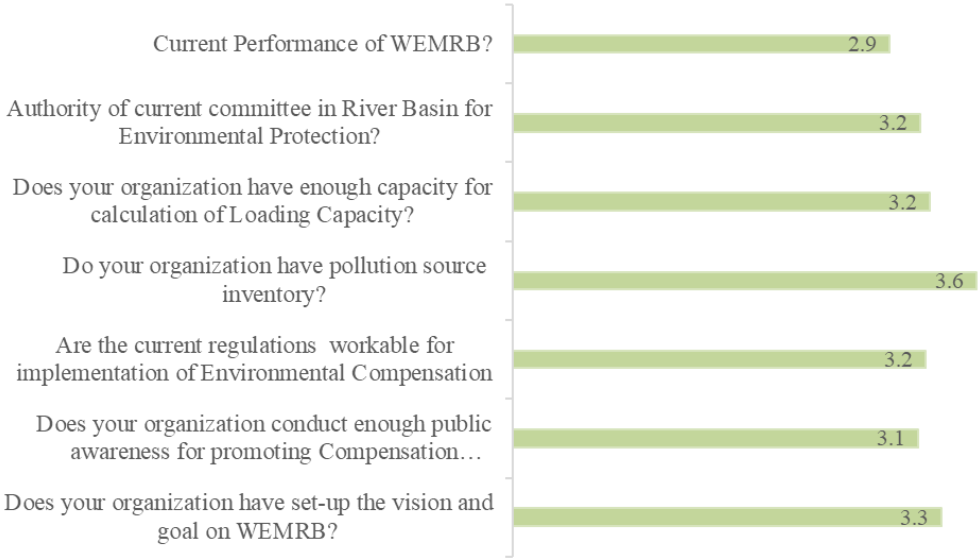
4, Data and information sharing and disclosure

5, Environmental compensation

6, Compensation responsibility and community awareness and participation

(2) Results of Initial CA

The survey revealed the current situation in MONRE/VEA and DONREs regarding RBWEM issues. Most participants showed concerns about limitation in budget, human resources, and limited guiding documents for implementation of environmental policy. On the other hand, It was observed that officers considered current organizational capacity and institutional capacity status were average level, as shown in the figure below.



On a scale of 5 (5: Very Good, 4: Good, 3: Satisfactory, 2: A little, 1: None)

Note: Number of respondents is 88.

Source: JET

Figure 3-5 Average Responses in Initial Capacity Assessment Survey

Figure 3-5 Average Responses in Initial Capacity Assessment Survey
5 and Table 3-8 showed current performance of RBWEM from initial CA results. Effectiveness of the current River Basin Committee for Environmental Protection was rated at an average level. The highest rated aspect among the 6 components related to legislative documents prepared under Output-1 was the capacity for operating WSDI at DONREs. The initial CA results were reported in the Attachment 6. From result of initial CA, capacity needs were interpreted, and top needs for CD was prepared. Based on the confirmed capacity needs, requirements on developing legislative documents were confirmed, and the training program of the Project was prepared.

Table 3-8 Capacity Assessment and Top Needs from Initial CA

Capacity Area	Initial Capacity	Capacity Needs
1. Coordination Mechanism	1) Not good legal system to support coordination among provinces 2) Average performance of the current River Basin Committee, which based mostly on volunteering altitude of participating provinces 3) Limited instruction from MONRE/VEA regarding coordination of RBWEM 4) Poor connection between DARD and DONRE in water resources use	1) Develop a proposal of coordination mechanism in RBWEM 2) Propose improvement of functions and roles of the current River Basin Committee, with consideration of enforcement and financial mechanism 3+4) Provide guideline with clear mandate and platform for coordination mechanism for participating provinces and concerned departments in a river basin
2. Assessment of Loading Capacity	1) Insufficient legal documents to guide the work on assessment of loading capacity 2) Insufficient structure for DONREs to implement the loading capacity assessment: - No computational models available for the calculation - Insufficient data for loading capacity assessment - Inadequate pollution load data from both point sources and non-point sources 3) Staffs have limited technical knowledge about the assessment: method, software application, Geographic Information System (GIS), river flow, seasonal impacts, tidal impacts, etc.	1) Develop a Draft Circular and Technical Guideline on assessment of loading capacity 2) Consider the gap of insufficient structure of VEA and DONREs: - Have software and computational models on water resource monitoring and modeling - Have a database feasible for calculation - Have adequate pollution source inventory data 3) Staffs are trained technical knowledge about loading capacity assessment
3. WDSI	1) Regulations and guidelines on WDSI Procedure are inadequate and incomplete 2) Insufficient structure for WDSI development: - Lack of comprehensive monitoring system - Overall inventory for all wastewater discharge sources has not been conducted - Lack of friendly WDSI database system	1) Develop a draft Circular and Technical Manual on WDSI development 2) Develop a sufficient structure for WDSI development - Install automatic monitoring system - Continuously conduct WDSI - Develop a friendly WDSI database using GIS
4. Data and information sharing	1) Regulations and guidelines for environmental data sharing are inadequate 2) No detail regulation on chairing agencies, unified information sharing manner while monitoring time and frequency of each province are very different. 3) The environment database is not presented systematically	1+2) Develop a guideline on environmental information and data sharing 3) Have a systematic database for loading capacity and WDSI management
5. Environmental Compensation	1) No specific Circulars on environmental Compensation. Decree 03 is too general 2) Difficult to determine coercion compensation	1) Develop guidance on determining environmental damage and compensation
6. Compensation Responsibility &Awareness	1) Difficult to verify principally the environmental damage	1) Develop guideline to identify sources of an incident & responsible agencies

Source: JET

(3) Training Content to Meet Capacity Needs

A priority training content was developed to meet the capacity needs of C/P. The planned training was related to provide knowledge and skills for total pollution load control approach for RBWEM,

which were calculation manners on pollution load analysis and loading capacity assessment, and relevant water environmental management activities such as WDSI development and application, water quality monitoring, Table 3-9 summarizes selected training contents mentioned above.

Table 3-9 Training Content Priority based on CA Survey of the Initial Stage

Item	Key Capacity Needs	Training content
Basic level skills and knowledge (Inner-provincial)	1) Improve monitoring data 2) Knowledge about Pollution load analysis 3) Introduction about modeling 4) Knowledge about WDSI 5) Database management 6) Knowledge for WQ management and control	1) WQ monitoring & WQ standard 2) Pollution load analysis 3) Introduction about hydraulic & WQ model 4) WDSI preparation classification and categorization of pollution sources including criteria 5) GIS application in data management 6) Environmental check and inspection 7) Planning and implementation of pollution source control 8) De-centralized and Centralized WWTS
Advanced level skills and knowledge (Inter-provincial)	1) Policy on coordination mechanism 2) Knowledge on computational model system 3) Knowledge on loading capacity assessment 4) Application of WDSI 5) Overall process of RBWEM 6) Planning IRBWRM in the Road Map 7) Environmental communication and public awareness	1) Development of policies and application of TPLC in RBWEM 2) QUAL2K & MIKE 11 simulation model usage 3) Loading capacity calculation & pollution load allocation 4) Pollution source control measures, ex. Jokaso 5) TPLC preparation and implementation of RBWEM plan 6) Development of policies and implementation plan of the road map 7) Organizing environmental awareness campaigns

Source: JET

3.5 Study Tour

The Study Tours were held to interact WGs in Cau and Dong Nai river basins where the target areas of PPs. The main expected participants of the Study Tours were the target provincial officers engaged in PPs as WG members. By the Study Tours, knowledge and information of both river basins were shared to enhance cooperation among DONREs of both river basins with improving the capacity of WGs.

3.5.1 1st Study Tour in Dong Nai River Basin

The 1st Study Tour was organized in September 2016 as study tour in Dong Nai-Saigon river basin. The main expected participants were persons engaged in PPs especially staff for DONREs in Cau river basin. The materials for presentation in the study tour were prepared by DONRE staffs in Dong Nai river basins (Binh Duong DONRE and Dong Nai DONRE). The Study Tour was held on 8th and 9th September 2016 as shown in table below. The total number of participants was around 60.

Table 3-10 Program of the 1st Study Tour (in Dong Nai River and Saigon River Basin)

Day /Date	AM/ PM	Contents				Note
		Activity	In charge	Venue	Time	
8 Sep (Thu)	AM	1) Introduction of general figure and direction of Dong Nai river basin	WENID	Ruby Room (1st floor of Becamex Hotel Thu Dau Mot)	08:30-09:00	HCMC DONRE absent
		2) Presentation on WEM in Binh Duong DONRE and practical experiences	WG of Binh Duong DONRE		09:00-09:30	
		3) Video of Ba Bo channel			09:30-10:00	
		Coffee break	-		10:00-10:30	
		4) Presentation on WEM in Dong Nai DONRE and practical experiences	WG of Dong Nai DONRE		10:30-11:00	
		5) Discussion	Chairperson: Binh Duong DONRE		11:00-12:00	
		Lunch	-		12:00-13:00	
	PM	6) Field visit - CEM in BDG Online monitoring system connecting CEM and industrial zone with wastewater treatment plant (WWTP) in Binh Duong province (13:30-14:00) - Under-ground water monitoring point (14:30-14:50) - Ba Bo channel and lake (15:00-15:40) -Thu Dau Mot urban WWTP in Binh Duong province (16:30-17:30)	WG of Binh Duong DONRE	Binh Duong province	13:30-17:30	HCMC DONRE absent
9 Sep (Fri)	AM	Opening	PMU	VIP Room (21st floor of the next building of Becamex Hotel Thu Dau Mot))	08:00-08:10	
		1) Presentation Vision and goal, ambient water quality standard and zoning, and monitoring system	JET		08:10-09:00	
		2) Small group discussion What and how to effective water quality standard and zoning, and RBWEM	JET		09:00-09:50	
		Coffee break			09:50-10:10	
		3) Overall discussion -presentation of result of each small group discussion -exchange view on RBWEM, pollution source control -tasks and issues for coordination on RBWEM	Chairperson: JET		10:10-11:40	
		Closing	PMU		11:40-12:00	
		Lunch			12:00-13:00	

Day /Date	AM/ PM	Contents				Note
		Activity	In charge	Venue	Time	
	PM	4) Option (additional field visit in Dong Nai Province)	Dong Nai DONRE	Dong Nai Province	13:30-15:30	TF in Dong Nai-Saigon river organized at this timing.

Source: JET

On the second day of the Study Tour, all participants had small group discussion and overall discussion based on the lesson and learned through field visit of the Study Tour and presentation by JET about the concept of river basin water environmental management. For small group discussion, the participants divided into 5 groups. One of the important objectives of the Study Tour is to enhance communication among each DONRE and between both target river basins. Therefore, each group for small discussion invariably comprised of 7 target DONREs officers. Group discussion topics and theme are shown in Table 3-11.

Table 3-11 Group Discussion Topics and Theme

Group Discussion Topics		
Concept of RBWEM	1. Each provincial DONRE requires to set a vision for RBWEM, 2. The visons for RBWEM need to be shared among the provinces in same river basin, and 3. Coordination mechanism is required for sharing the vision and considering RBWEM.	
Observation Points of Filed Visit	1. Status of river network and water environmental condition 2. Adopted technology for control of domestic and industrial wastewater 3. Advanced measures for water quality monitoring including groundwater	
No.	**Theme**	**Group**
1	**Required actions by DONRE on RBWEM** Key words: 1) Monitoring, 2) Promotion, 3) Control of industry	A & B
2	**More effective water quality monitoring for RBWEM** Key words: 1) Frequency, 2) Target of monitoring, 3) Cooperation	C & D
3	**View point for setting vision of RBWEM** Key words: 1) Control of industry, 2) Water resource, 3) Conservation of environment	E

Note: Group discussion was organized by dividing participants into five group.
Source: JET

Participants had opinion exchanges actively. Through discussion, participants understood that it was very important to grasp characteristics of wastewater discharge sources with their pollution load in river basin level for considering required actions, more effective water quality monitoring system, and setting vision of RBWEM.

Photos of group discussion are shown in Figure 3-6 Photos of 1st Study Tour

12.

Presentation and Discussion (AM: 8 Sep. 2016)

Field Visit, Ba Bo Channel (PM: 8 Sep.2016)

Field Visit, Thu Dau Mot urban WWTP (PM: 8 Sep.2016)

Small & Overall Ground Discussion (AM: 9 Sep. 2016)

Source: JET

Figure 3-6 Photos of 1st Study Tour

3.5.2 2nd Study Tour in Cau River Basin

The 2nd Study Tour was organized in September 2017 in Cau river basin. The main expected participants were officers engaged in PPs especially DONREs staffs in Dong Nai river basin. he Study Tour was held on 21st, 22nd and 23rd September 2017 as shown in table below. Total number of participants was around 80.

Table 3-12 Program of the 2nd Study Tour (in Cau River Basin)

Day	Time	Contents			Note
		Activities	Venue	In charge	
Sep 21 (Thu)	8:00-10:00	Travel (Ho Chi Minh City to Hanoi)	-	JET	
	12: 00~	Travel from Noi Bai airport to Bac Giang Check in the hotel and take lunch	-	JET	
	13:30~	[Registrations]	Muong Thach Bac Giang	JET	
		[Preparation for Study Tour] - To set groups (10 people/group. Total 3 groups) - Brief introduction for site visit		Bac Giang DONRE	
	14:00~	[Site Visit] - Visit Phuc Lam Slaughter craft village - Van Trung IZ (Bac Giang) hot spot discharging wastewater to Cau river - Quang Chau IZ for confirming latest monitoring activity	Cau river basin in Bac Giang	Bac Giang DONRE	
Sep 22 (Fri)	8:00-8:10	- Opening	Muong Thanh Bac Giang	Bac Giang DONRE	
	8:10-9:00	1) Presentation - Brief explanation of PPs results in Cau river basin - Introduction of Coordination mechanism - Explanation of contents of Group Discussion		JET	
	9:10-9:50	2) Small group discussion - How to make agreement on the river basin - Several conditions to be discussed		WG members	
	9:50-10:10	Coffee break		JET	
	10:10-11:40	3) Overall discussion - Presentation of results of each group discussion - Opinion exchange for coordination mechanism on RBWEM		Bac Giang DONRE and JET	
	11:40-12:00	Middle Closing		Bac Giang DONRE and JET	
	12:00-13:00	Lunch		JET	
	14:30-14:50	Move to the school for environmental awareness event		Subcontractor and JET	
	15:00-16:00	Joining the environmental awareness event	Thai Thuan High School		
	<WG members who would Environmental Awareness event>				
Sep 23 (Sat)	6:30-6:40	Move to the School for Environmental Awareness Event	-	Subcontractor and JET (K. Yamamoto)	
	7:00-11:30	[Awareness activity] Joining environmental awareness activities.	Cau river basin in Bac Giang		
	12:00-13:00	Lunch			

Source: JET

In the morning on the second day of the Study Tour, participants who did not attend the 4th Task Force meeting had a group discussion and overall discussion. For the discussion, the results of PPs in Cau river

basin was used, and discussed on required coordination to allocate the estimated loading capacity in river basin level to each province. Group discussion topics are shown in Table 3-13.

Table 3-13 Group Discussion Topic

Group Discussion Topics	
Obtaining Consensus for Allocating Loading Capacity in River Basin Level	1. To identify what kinds of item to be considered for obtaining consensus 2. To identify key points to make consensus with main actors for reducing pollution load 3. To discuss on identified key points from the viewpoint of each DONRE 4. To propose MONRE with more integrating allocation method with various aspects

Source: JET

Participants had opinion exchanges actively, based on the group discussion topics shown in Table 3-13. The identified key points to make consensus for allocating loading capacity in river basin level to each province by group discussion are shown in Table 3-14. The results of discussion were used as reference information for developing a guideline for coordination mechanism in Output-1. In addition, through the discussion, many participants pointed out that MONRE/VEA should develop national level regulation for enhancing coordination among the provinces in same river basin, and organizations engaging coordination, such as RBOs, are required.

Table 3-14 Discussion Results in 2nd Study Tour

Item	Discussion Result
Key points to make consensus	- Middle-term and long-term pollution control plan - Top-down instruction for obtaining consensus - Bottom-up discussion for obtaining consensus - Sharing existing issues - Sharing required information such as monitoring and inspection data - Knowledge on calculation process of loading capacity - Securing of provincial budget - Awareness raising
Proposal	- MONRE/VEA should develop national level regulation for enhancing coordination among the provinces in same river basin. - Organizations engaging coordination, such as RBOs, are required. - It is required to promulgate unified regulation on wastewater discharge zoning at river basin level.

Source: Discussion record of 2nd Study Tour

Photos of group discussion are shown in Figure 3-7 Photos of 2nd Study Tour

.

Field Visit, -Van Trung IZ (PM: 21 Sep.2017)

Field Visit, Quang Chau IZ (PM: 21 Sep.2017)

Group Discussion/Role Playing (AM: 22 Sep. 2017)

Environmental Awareness Activity (AM: 23 Sep. 2017)

Source: JET

Figure 3-7 Photos of 2nd Study Tour

Through holding the Study Tours, both river basins environmental officers' relationship has been enhanced and this outcome was highly evaluated by the participants. The relationship contributed to the success of the TF meetings and JCC meetings, and taking good occasions to discuss the river basin management by all relevant stake holders.

Besides, it is considered to takes a lot of effort for organizing similar meetings due to lack of regulation to hold such meeting, and organizer designated officially. In the Project, it was not so easy for PMU to prepare the program, logistic arrangement and implementation without assistance of JET. In future, it is recommended to set regulation to hold regular meeting among the provinces not only in same river basin but also in different river basins with organizer designated offically.

The activities for integrating relationship is very important. At the same time, organization manner, timing and scale should be designed carefully to have meetings for coordination regularly and timely.

3.6 Subcontract Work

One of the important activities for the Project is to show example of pollution load analytical results and loading capacity assessment to C/Ps through pilot project (PP). For obtaining analytical results in PP, C/Ps co-worked with external experts hired as sub-contractor of the Project. As parts of PPs activities in both river basins, totally 5 works had been planned and finished as following table. The outcomes and results from these works had been utilized in technical trainings in this project.

Table 3-15 Summary of Subcontract Works

No.		Item	Objectives	Contents	Duration
1	1	Simulation Modeling in Cau River Basin	To implement preliminary work for pollution load calculation, such as dividing the target basins into sub-basins, setting of pollution load units, and estimating the amount of pollution load by each sub-basin.	Depiction target sub-basin areas to use DEM data and satellite image to use GIS software, setting pollution load unit, collecting and calculation of basic information for estimation of loading capacity, etc.	From; Aug. 2016, To; May. 2017
	2	Simulation Modeling in Dong Nai and Saigon River Basin			From; Aug. 2016, To; May. 2017
2	1	Pollution Source Inventory (WDSI) Survey in Cau River Basin	To acquire data and information for water pollution control activity and river basin water environmental management, and To develop draft pollution source inventories (the WDSIs) of main pollution sources in the target river basins and to prepare pollution source maps prepared by GIS	Reviewing of existing WDSI of each DONREs, preparation of WDSI format to use Microsoft Excel and Microsoft Access, collecting pollution source data through questionnaire and water analysis, inputting pollution source data into WDSI, building database, making pollution source map, etc.	From; Apr. 2016, To Dec. 2016
	2	Pollution Source Inventory (WDSI) Survey in Dong Nai and Saigon River Basin			From; Apr. 2016, To; Jan. 2017
3		Environmental Awareness Activity and Information Sharing Activity	To conduct demonstration activity on river water sampling and field analysis together with Bac Giang DONRE for raising awareness on RBWEM, and To share the outcome of demonstration activity described above by information sharing existing internet homepage operated by MONRE/VEA and /or Bac Giang DONREs	Preparation of Water Quality Test Kits, goods (T-shirts and caps) for environmental awareness activity events and materials for lecture before field work, implementation of environmental awareness event (total 3 times), reviewing results of each event and feedback to next environmental awareness activity, developing materials for information sharing and web-material, supporting on the dissemination of the activity results, etc.	From; July, 2017, To; November 2018

Source: JET

3.7 Training in Japan

The Project organized 3 times of trainings in Japan in total. Trainings in Japan were planned, coordinated, and supported by JET. Each Training in Japan had about 10-days' training program to learn knowledge and experience of water resource management in Japan, and improve C/P's motivation to the Project. The participants of each training are listed in Attachment 7 of this report.

In line with the project purpose officially agreed in the Record of Discussions (R/D) signed on 24 August 2015 between JICA and MONRE, the main objectives of the JICA Training in Japan are to provide Vietnamese counterparts with opportunities to learn:

- Overview of water environmental policies in Japan including river basin water environmental management,
- Preparation and implementation of total pollution load control
- Implementation System of Water Environmental Management Policy in the Local Government, and
- History of Water Environment Management by river basin management board in Japan, and site visit

3.7.1 1st Training in Japan

(1) Summary of 1st Training in Japan

The 1st Training was held in July 2016 for 11 management level officers (Managers of WENID, ESI, and local governments in Cau and Dong Nai river basins). The trainees visited Tokyo,

Yokohama City, and Yodo River Basin in Osaka prefecture, and learn characteristics and lessons of River Basin Management. Summary of 1st Training in Japan shows in Table 3-16.

Table 3-16 Summary of 1st Training in Japan

Item	Contents
Title	Administrative capacity enhancement for river basin management
Period	6th July (Wed) – 13th July (Wed), 2016 (in total 8 days)
Number of Participants	11 participants (5 participants from MONRE and 6 participants from target DONREs)
Main Places for Training	Tokyo, Yokohama city and Osaka city
Language	Vietnamese – Japanese

Source: JET

(2) Program

The training program is shown in Table 3-17. The program was specifically designed for this Project.

Table 3-17 Program of 1st Training in Japan-July 2016

Day		Time	Activity	Lecturer etc..	Stay
1	Jul. 6 (Wed)	-	(Move from Ha Noi to Narita) (Move from HCMC to Narita)	-	JICA Tokyo International Center (TIC)
2	Jul. 7 (Thu)	10:00-12:00	Briefing	TIC	
		13:15-13:45	Courtesy call to JICA	JICA HQ	
		14:00-14:30	Orientation	JET, Nippon Koei	
		14:30-17:30	Lecture: The history of administrative measures for Japan's water pollution problems and overcome	Mr.Imai, former JICA Advisor	
3	Jul. 8 (Fri)	09:30-12:00	Lecture: 1) National policy-making process about the water environment management, the use of environmental information Lecture: 2) Introduction of implementation of water quality total reduction system, Introduction of the outline and setting method of Japan's total regulatory standards	Water Environnent Division, Environnemental Management Bureau, MOE Office of Environmental Management of Enclosed Coastal Seas, Environmental Management Bureau, MOE	
		14:00-17:00	Lecture: 1) Introduction of lecturers, trainees Lecture: 2) Overview of the environmental works of Yokohama City Lecture: 3) Yokohama City's water environmental management measures ("Water environment and regulatory guidance", "Site inspections to the offices in the city") Observation: "Explanation about the Institute" and facility tour at the Yokohama Environmental Science Research Institute	Env. Conservation Department, Env. Planning Bureau, Develop Cooperation Division, International Affairs Bureau, City of Yokohama Env. Science Research Institute, Policy Coordination Department, Environmental Planning Bureau	
4	Jul. 9	AM/PM	Day off	-	

Day		Time	Activity	Lecturer etc..	Stay
	(Sat)				
5	Jul. 10 (Sun)	AM/ PM	(Move from Tokyo to Kyoto)	JET	Hotel in Osaka
			Understanding Japanese Culture in Kyoto	-	
6	Jul. 11 (Mon)	09:30-17:00	Lecture: Experience and lessons of the river basin management in Japan Lecture: Regarding the efforts on river maintenance basic policy Site visits: for a typical river basin management from upstream (=Uji River) to downstream of Yodo River	The Yodo-gawa River System Committee Kinki Regional Development Bureau, Ministry of "Land, Infrastructure, Transport and Tourism"	
7	Jul. 12 (Tue)	AM	(Move from Shin-Osaka to Tokyo)	JET	JICA Tokyo International Center (TIC)
		PM	Preparation for the presentation of the training report Presentation/Evaluation Meetings and closing ceremony	JICA, JET	
8	Jul. 13 (Wed)	-	(Move from Narita to Ha Noi) (Move from Narita to HCMC)	-	-

Source: JET

(3) Outcome of Training

Based on the answers of the questionnaire to the trainees, the trainees considered that the followings obtained through the 1st training in Japan can be referred for proceeding RBWEM in Vietnam.

- Clarification of demarcation for RBWEM between central and local governments,
- Clarification of demarcation for RBWEM between the concerned central ministries, such as Ministry of Environment and Ministry of Land, Infrastructure, Transport and Tourism in Japan,
- Coordination among the concerned organizations in a river basin, based on the lecture in Yodo river
- Regulations actual management procedures on total pollution control,
- Utilization of monitoring data for RBWEM in local government, based on the lectures by Yokohama City

Trainees prepared the Action Plans for enhancing RBWEM in Vietnam with knowledge and experiences obtained training in Japan. The concept of Action Plan was documented and reported to VEA.

3.7.2 2nd Training in Japan

(1) Summary of 2nd Training in Japan

The 2nd Training was held in July 2017 for 10 manager and staff level officers (VEA, WENID, ESI, and local governments in Cau and Dong Nai river basins). The trainees visited Tokyo, Kawasaki city, Edo-gawa River Basin in Tokyo, Ibaragi, Chiba, Saitama prefecture, and learn characteristics and lessons of River Basin Management. In addition, the trainees visited private wastewater treatment company and its laboratory, and research center of Nippon Koei in Science city Tsukuba. Summary of 2nd Training in Japan shows in Table 3-17.

Table 3-17 Summary of 2nd Training in Japan

Item	Contents
Title	Administrative capacity enhancement for river basin water environmental management in Cau and Dong Nai – Saigon River basin
Period	5th July (Wed) – 14th July (Fri), 2016 (in total 10 days)
Number of Participants	10 participants (3 participants from MONRE and 7 participants from target DONREs)
Main Places for Training	Tokyo and Surrounding Cities (Yokohama and Tsukuba)
Language	Vietnamese – Japanese

Source: JET

(2) Program

The training program is shown in Table 3-18. The program was specifically designed for this Project.

Table 3-18 Program of 2nd Training in Japan-July 2017

Day		Time	Activity	Lecturer etc..	Stay
1	Jul. 5 (Wed)	-	- Flight (Hanoi/ Ho Chi Minh City to Narita/Haneda)	-	JICA Tokyo International Center (TIC)
2	Jul. 6 (Thu)	10:00-12:00	- Briefing	TIC	
		14:00-14:30	- Explanation of the Training Course	TIC, JET	
		14:30-17:30	- Lecture: Experience of Water Pollution and political countermeasures against it in Japan	Dr. Soichiro Seki (Tokyo University, former permanent secretary of MoE, Japan)	
		18:00-20:00	- Welcoming dinner party by JICA Expert Team		
3	Jul. 7 (Fri)	09:30-12:00	- Lecture: Legislation of Water Quality Conservation in Japan, and Environmental Standard for Environmental Management and Water Quality of Public Water - Lecture: History and implementation of total pollution load control in Japan	Ministry of Environment, Japan	
		13:30-17:00	- Lecture: Implementation System of Water Environmental Management Policy in the Local Government, monitoring and inspection based on Water Pollution Control Act and so on.	Kawasaki Environment Research Institute	

Day		Time	Activity	Lecturer etc..	Stay
			- Visitation: management and operation method of automatic wastewater monitoring		
4	Jul. 8 (Sat)	AM/ PM	- Half-day Tokyo tour - Half day off	-	
5	Jul. 9 (Sun)	AM/ PM	Day off	-	
6	Jul. 10 (Mon)	09:00-17:30	- Lecture and experimental tour: Industrial wastewater treatment technology in Japan	Organo Cooperation	
7	Jul. 11 (Tue)	09:00-17:30	- Lecture: Recent Case of River Basin Management for Improvement of Water Quality Improvement - Excursion: River water management facilities in Edo River Basin (Kuwabukuro Biotope Park along Ayase river, Kogasaki river purification plant, Watershed conservation canal, Matsudo River for water activities, The North Chiba Water Conveyance Channel, Visitor center)	Edo-gawa River Office, Ministry of Land, Infrastructure, Transportation and Tourism	
8	Jul. 12 (Wed)	09:00-17:30	- Introduction of the case study of water quality simulation model utilization for RBWEM - Hands-on training on pollution load analysis and simple water quality simulation - Discussion	JET, Nippon Koei Research and Development Center	
9	Jul. 13 (Thu)	09:00-12:00	- Preparation for Presentation	JET	
		13:30-16:00	- Presentation of Output through the training - Evaluation of the training - Conferment of the Certificate of Completion	JICA, JET	
10	Jul 14 (Fri)		- Flight (Narita/Haneda to Hanoi/Ho Chi Minh City)	-	-

Note TIC: JICA Tokyo International Center
Source: JET

(1) Outcome of Training

Based on the answers of the questionnaire to the trainees, the trainees considered that the followings obtained through the 2nd training in Japan can be referred for proceeding RBWEM in Vietnam.

- Clarification of demarcation for RBWEM between central and local governments,
- Coordination between the concerned organizations in a river basin, and quantitative evaluation system on trend of river environmental improvement operated in Ayase river basin,
- Regulations actual management procedures on total pollution control, leaded by local government, and
- Pollution load analysis using water quality simulation model.

Trainees prepared the Action Plans for enhancing RBWEM in Vietnam with knowledge and experiences obtained training in Japan. The concept of Action Plan was documented and reported to VEA.

3.7.3 3rd Training in Japan

(1) Summary of 3rd Training in Japan

The 3rd Training was held in September-October 2018 for 10 officers (from ESI, DWM, and local governments in Cau and Dong Nai river basins). The trainees visited Tokyo, Shiga prefecture, and Yodo River Basin in Osaka prefecture, and learn characteristics and lessons of River Basin Management. Summary of 3rd Training in Japan is shown in Table 3-19.

Table 3-19 Summary of 3rd Training in Japan

Item	Contents
Title	Training Program: Administrative capacity enhancement for river basin management
Period	26th September (Wed) – 4th October (Fri), 2018 (in total 10 days)
Number of Participants	10 participants (3 participants from MONRE and 7 participants from target DONREs)
Main Places for Training	Tokyo, Shiga prefecture and Osaka city
Language	Vietnamese - Japanese

Source: JET

(2) Program

The training program is shown in Table 3-20. The program was designed for this Project including water resource management in river basins.

Table 3-20 Program of Training in Japan-July 2018

Day		Time	Activity	Lecturer etc..	Stay
1	26 Sep. (Wed)	-	- Flight (Hanoi/ Ho Chi Minh City to Narita/Haneda)	-	JICA Tokyo International Center (TIC)
2	27 Sep. (Thu)	10:00-12:00	- Briefing	TIC	
		13:30-14:00	- Explanation of the Training Course	Nippon Koei	
		14:00-17:00	- Lecture : History of Water quality management with Government policy	Dr. Soichiro Seki (Tokyo University, former permanent secretary of MoE, Japan)	
		17:00-17:30	- Courtesy to JICA HQ	JICA HQ	
3	28 Sep. (Fri)	9:30-11:30	- Lecture: History and implementation of total pollution load control in Japan	Ministry of Environment, Japan	
		13:00-16:30	- Lecture/ Site visit : Current countermeasure of COD and Phosphorus at Tokyo bay.	Tokyo metropolitan government	
4	29 Sep (Sat)	AM/ PM	Holiday	-	
5	30 Sep (Sun)	AM/ PM	Holiday Move (Tokyo to Kyoto)	-	Hotel at Kyoto or

Day		Time	Activity	Lecturer etc..	Stay
6	1 Oct (Mon)	9:00-12:00	- Lecture : Implementation process of RBWEM at local government lecture/ Site visit : Lake biwa environmental research institute	Siga prefecture	JICA Kansai International Center (KIC)
		14:00-17:00	- Lecture: Governance Improvement in Lake Basin Management (ILBM): Lake Biwa and Global Experiences - Discussion : River basin management on Japan and Vietnam	Dr. Masahisa Nakamura , Distinguished visiting professor of Shiga Univ.	
7	2 Oct (Tue)	AM	- Lecture : Experiences and Challenges on RBWEM in Japan Lecture : Practical activity based on the River improvement basic policy	Yodo river management office, MLIT	
		PM	Site visit : Typical watershed management		
8	3 Oct (Wed)	9:00-12:00	- Lecture : Public awareness activity for Conservation of river basin	Lake Biwa-Yodo River Water Quality Preservation Organization	
		14:00-16:00	- Utilization of project results after project completion	JICA, JET	
9	4 Oct (Thu)	AM	- Preparation for Presentation	JET	
		PM	- Presentation of Output through the training - Evaluation of the training - Conferment of the Certificate of Completion	JICA, JET	
10	5 Oct (Fri)		- Flight (Narita/Haneda to Hanoi/ Ho Chi Minh City)		

Source: JET

(3) Outcome of Training

Based on the answers of the questionnaire to the trainees, the trainees considered that the followings obtained through the 3rd training in Japan can be referred for proceeding RBWEM in Vietnam.

- Clarification of demarcation for RBWEM between central and local governments,
- Coordination among the concerned organizations in a river basin, based on the lecture in Yodo river
- Regulations actual management procedures on total pollution control for Tokyo bay, and
- Development strategy and operation of basin-wide sewerage system

Trainees prepared the Action Plans for enhancing RBWEM in Vietnam with knowledge and experiences obtained training in Japan. The concept of Action Plan was documented and reported to VEA. In addition, it was presented in the project outcomes dissemination workshop held in November 2018.

3.8 Procured Equipment

The project had procured several equipment to progress smoothly itself and contribute to the sustainable development of C/P. The following table shows procured equipment by the project. This equipment was handover to C/P, and the Minutes of Receipt of Equipment/Assets was attached in Attachment 8.

Table 3-21 List of Procured Equipment

Country	Item	Quantity	Remarks
In Japan	Flow meter	2	-
In Vietnam	Vehicle	1	
	Desk-top type Computer	2	OS type: Microsoft Office Professional Including Anti-Virus software
	Lap-top type Computer	7	OS type: Microsoft Office Professional Including Anti-Virus software
	Multifunction Printer	2	Function: Color print/ Copy/ Scanning/Fax
	Projector	1	-
	Arc GIS (software)	2	-
	MIKE HYDRO RIVER WQ Enterprise (software)	2	

Source: JET

3.9 Project Newsletter

The Project Newsletters have been published on the JICA official Web site[2] to inform the project progress to the parties concerned of the project and public in every 3 months from April 2016, and totally 14 Newsletters had been launched like as the following table. Vietnamese version of the Project Newsletters were shared with PMU and DONREs by e-mail, and TF meetings.

Table 3-22 Issued Project Newsletters

No.	Main Topics	Month
1	Introduction of the Project (Background, Overall Goal, Purpose, and Expected Outputs), Project Approval by GOV, and 1st JCC Meeting & Kick-off Workshop	April 2016
2	Introduction of the Function of JCC, PMU, TF and WG, Progress of PPs (Subcontract Work and Initial Capacity Assessment), Progress of Development of the Draft Circulars (Compensation and Legal system review) and Cooperation Activities with MONRE (Mass Death of Fish Issue) and World Bank	July 2016
3	1st Training Course in Japan (Outline of the schedule, Visited places, and Impression from Counterpart)	July 2016 (Extra)
4	Consultation Workshop for Draft Circular for Stipulation of procedures to Claim Compensation for Environmental Damages, 1st Study Tour at Binh Duong Province, the 1st Task Force Meeting in Dong Nai river basin and Cau river basin, and Progress of BTC	October 2016

[2] https://www.jica.go.jp/project/vietnam/043/index.html

No.	Main Topics	Month
5	2nd JCC Meeting (Outline of the meeting, detail of discussed topics and expected activity after the meeting)	December 2016
6	Joint Workshop with Vietnam Industrial Pollution Management Project funded by the World Bank (Sharing and Understanding of the achievement of both 2 projects)	January 2017
7	Entering the second year with the third JCC meeting, Workshop on Integrated Water Resources Management, and the 3rd Task Force meeting in two targeted river basins. Progress of circular development and capacity building	April 2017
8	Launching advanced training courses in targeted provinces. The 4th TF meeting, Technical Consultation Workshop for circular development, and regular PMU meetings were organized	June 2017
9	The 2nd Training in Japan, the 1st public awareness activity in Bac Giang, and the 2nd Study Tour were conducted successfully. Advanced Training Courses, Technical Workshop for circular development are continued	September 2017
10	Entering the final year with finalizing process of circulars and Technical Guideline, the 3rd public awareness event, and technical consultation workshop. Action Plan was introduced to DONREs for contributing to Output -3. In project management matter, Mr. Adachi would maintain his duty in HQ and supervise this project on mission basis, project vehicle was handed over to Vietnamese side	December 2017
11	The Monitoring mission by Mr. Ichiro Adachi was conducted at the same time with the fifth Task Force Meeting in two river basins. Regular PMU meeting was organized to follow up changes in VEA's structure and MONRE's legal document development.	March 2018
12	Fourth Join Coordinating Committee (JCC) (the project progress, direction and development of legal documents, Action Plan, outcomes of the project, the revision of the Project Design Matrix, and extension of the Project), Sixth Task Force Meeting	June 2018
13	Regular PMU meetings were hold to follow up of the 4th JCC meeting, the way finalizing documents and outstanding issues. Training in Japan on Water Environment Administration.	September 2018
14	Regular PMU meeting was held to discuss and approve the project extension and finalization of activities for Output-1 and Output-3. Dissemination Workshop, Third Training in Japan for Counterparts "Administrative capacity enhancement for river basin water environmental management for Cau and Dong Nai – Sai Gon river basin".	November 2018

Source: JET

4. Output-1: Capacity of MONRE/VEA and Target DONREs in Legal Document Development and Enforcement on RBWEM is Strengthened, and MONRE/VEA is Going to Institutionalize RBWEM Mechanism

Output-1 focused on preparing new legal documents, such as final draft circulars or guidelines. it was necessary to examine various matters such as consistency with the existing legal system, collecting opinions from relevant organizations, budget collateral, and so on. To have consistency of existing legal systems, existing legal system review was conducted. For collecting opinions among relevant organizations, discussions with such organizations and experts who collaborate with MONRE/VEA, were made by holding the technical meetings and TF meetings. Following sections are described the activities under Output-1.

4.1 Activity 1-1: Review Current Legal Documents and Enforcement Status on RBWEM, and Find out Conflicts and Duplications in These Documents to Propose Amendments and Supplementations

4.1.1 Legal and Institutional Review Survey

The major objectives of this survey are described below.

i) To grasp overall legal and institutional conditions including execution practices.

ii) To identify current problems and constraints such as contradiction, duplication, ambiguous and not practical description, and so on, in the real executing occasions.

iii) To analyze and evaluate effectiveness and efficiency in specific and in entire/ general regarding the legal documents and the institutional practices.

iv) To decide overall directions and to highlight issues to be improved for development of Circulars.

The survey was conducted by the sub-contract works employing four local experts in charge for the following 6 Circulars from August to December in 2016.

- Coordination mechanism for river basin water environmental management: Circular-1.
- Assessment of loading capacity and estimation of discharge permit: Circular-2.
- Main wastewater discharge sources for WEMRB: Circular-3.
- Information sharing and disclosure system for inter-provincial WEMRB: Circular-4.
- Guiding format and procedure of requesting environmental compensation for natural environment: Circular-5.
- Stipulating selecting criteria and responsibilities of agency providing environmental monitoring and assessment service to collect evidences compensation and environmental damage; and guiding the setting up and operation of councils for appraising data and proof for determining environmental damages: Circular-6.

4.1.2 Results of the Legal and Institutional Review Survey

Main issues on the current legal and institutional system in Vietnam are summarized based on the review survey.

(1) Circular-1; Final Draft Guideline on Coordination Mechanism for RBWEM

i) For Decree 120/2008/ND-CP and Decree No. 201/2013/ND CP on the management of river basins, it should be to specify responsibilities of ministries, organizations, and individuals on exploitation and use of water resource in river basin, to supplement financial mechanism for coordination and supervision, to clarify scope of dispute for settlement.

ii) For the current Environmental Protection Committees in Cau, Nhue-Day, and Dong Nai river basins, it should be to apply bridging functions to other river basin committees as model based on their lessons learned, to integrate and share their experiences through discussion in a task force committee consisting of central and local officers, experts, and academic researchers, to open its result to the public through media, and to establish a model river basin committee.

(2) Circular-2: Circular on Assessment of Loading Capacity

i) Limitations and shortcomings in the internal system of Law on Water Resource and Law on Environmental Protection,

LEP 2014 and Decree No. 38/2015/ND-CP on management of waste and scrap has enacted regulations on the load capacity evaluation and estimation of wastewater discharge quotas, but they are just regulations based on general principles, without specification of the methods and conducting procedures.

ii) Overlap between LWR, LEP and other legal documents

- LEP 2014 considers water to be an important environmental component and Law on Water Resource (LWR) 2012 confirms that water resources must be managed in terms of quality and quantity, and protect water resources from pollution. The same connotation: conservation of river water quality defined in 2 different document systems lead to overlap, confusion for state management agencies.
- Decree 80/2014/ND-CP on discharge and wastewater treatment regulates technical regulations for wastewater as follows: MONRE stipulates the environmental technical regulations for wastewater from urban drainage systems, industrial zones and rural residential areas with concentrated discharge into receiving water, and technical regulations on decentralized wastewater discharge into the receiving water. MOC also issues technical regulations on the discharge of wastewater into urban drainage systems, as well as MARD issues technical regulations on discharging wastewater into the system of irrigation.

iii) Limitations and shortcomings of Circular No. 2/2009/TT-BTNMT

MONRE promulgated Circular No. 2/2009/TT-BTNMT on capacity of water body to receive wastewater describes assessment method based on mass balance concept. This Circular No. 2/2009/TT-BTNMT was widely used to assess wastewater receiving capacity of river sections. However, it has several limitations on scope of applied certain river section only, not to apply in river basin, on time frame only at present, and on calculation method without consistency especially between Section 1 and 2.

(3) Circular-3: Final Draft Legalizing Document on Main Wastewater Discharge Sources for RBWEM

i) Overlapping on the current legal and institutional system on management of waste water discharge

- Legal system on waste water management is separately regulated by LEP, LWR, and Law on Exploitation and Protection of Irrigation Works. This overlapping situation is sometimes embarrassed the state management agencies and causes difficult for investors to cope with. It should be unified and integrated in order to provide favorable condition for state management agencies and investors.

ii) Regulation on reporting and information sharing

- Several issues on reporting and information sharing on pollution source inventory were pointed out; i) general, unified guidelines on data management, reporting mechanism, reporting forms,

and frequency, ii) report for specific pollution sources such as hazardous substances, iii) no provisions of management body on information regime, published report publication, information sharing and disclosure, and public awareness.

(4) Circular-4: Final draft Guideline of Data and Information Sharing for Loading Capacity Calculation and Wastewater discharge sources Inventory Development

i) Current legal system has many provisions on information sharing and disclosure are very diverse and have contributed to ensuring transparency and environmental monitoring. However, most provisions for inter-provincial river basin environmental management are provided in many different documents with different validity, so there are many difficulties to access and exploitation.

ii) Although the law stipulates the responsibilities of the ministries, branches and localities in gathering, reporting and sharing of information for inter-provincial river basin environmental protection, but this issue has not been specified, explicit and have not defined in a legal text.

iii) There are many provisions defines the responsibility of many subjects relating to supplying, publishing information water inter-provincial river basin environmental management but the information contents which are provided and published also have overlapping and there are no specific sanctions to ensure implementation of this responsibility. For example: According to the provisions of Article 54 of the Law on Environmental Protection, the provincial People's Committees are responsible to publish the waste sources in the river basin; disclosure of information about the river section is no longer capable of receiving waste. MONRE is responsible for the investigation, bearing capacity evaluation, determine wastewater discharge quotas consistent with the objective of water use and disclosure of information. Thus, there is no clear demarcation on the volume of wastewater discharged into rivers belong to responsibility of the provincial People's Committee and MONRE.

iv) Under the current regulations, many subjects are responsible for providing, reporting, disclosure of information relating to the management of river basin water environment. However, there are no specific guidelines on the time of supply, publication, disclosure of information and sanctions to ensure implementation of these responsibilities.

v) There are no specific regulations and sanctions to ensure right to be supplied the information related to the river basin water environment management.

(5) Circular-5: Final Draft Circular including Regulations on Guiding Format and Procedure of Requesting Environmental Compensation for Natural Environment

As for the matters on the compensation for RBWEM, one review research activity was conducted. The purpose is to review research of legal documents governing the three sectors, including state compensation liability, compensation for damages to properties, health and life, compensation for damages to the natural environment, and analyze the actual settlement of damage compensation cases result.

i) Through this research activity, the following issues were confirmed.

There are various legal documents governing the three sectors; however, regulations on damage compensation are prescribed the most thoroughly and comprehensively in the following four documents:

+ Law on State Compensation Liability 2009

+ The Civil Code 2015

+ The Civil Procedure Code 2015

+ Law on Environmental Protection 2014

+ Decree No. 03/ND-CP in 2014

- Currently, the laws prohibit the sufferers from class action. Permission of class action shall create favorable conditions for the sufferers to make better protection of their legitimate interests and reduce pressure for the courts in the settlement of lawsuits. Class action lawsuit allows one individual or a group to represent the suffered community to file lawsuits at courts without any official authorization document of the sufferers. The courts' judgments shall be valid for all the individuals involved in the class action lawsuit.
- The time limit for application of damage compensation liability in the environmental field is one of the controversial issues. Damage must be compensated in full and timely as prescribed by the laws, which is hardly enforceable because of high value and difficult determination of environmental damage.
- It is necessary to specify which units under people's committees of all level and MONRE are responsible to claim damage compensation as well as to collect and assess data, evidences for calculation of damages to the natural environment. Moreover, regulations on arbitration settlement method should be supplemented and detailed.
- Comparing with compensation for damage to properties, life and health caused by violation of environmental protection law in particular and compensation for environmental damage in general (usefulness of the environment), law system on state compensation liability is relatively comprehensive and synchronous.
- The agencies responsible for state management and settlement of damage compensation in the field of state compensation liability are organized properly and assigned with clear functions and tasks, especially the Department of State Compensation under Ministry of Justice (Decision No. 767/QD-TTg dated 23 May 2011) and divisions under Departments of Justice of the provinces and cities. People's committees of all levels and MONRE are compensation-claiming agencies in the field of environment; however, the laws have not prescribed which units under such agencies are responsible to claim compensation for damages to the natural environment as well as their functions and tasks. There is no agency specialized in monitoring and management of regulations on compensation for property, life and health damage.
- The most important shortcoming in settlement of damage compensation in the three mentioned-above sectors is determination of damage-causing entity and calculation of damage compensation amount.

ii) Based on the review and analysis, one procedure about the compensation treatment manner was proposed. This idea was reflected to the draft Circular-5.

(6) Circular-6: Final draft Circular including Regulations on Stipulating Selecting Criteria and Responsibilities of Agency Providing Environmental Monitoring and Assessment Service to Collect Evidences Compensation and Environmental Damage; and Guiding the Setting up and Operation of Councils for Appraising Data and Proof for Determining Environmental Damage

The legal review of the related contents of Circular-6 was conducted. The purpose is to collect and analyze the legal documents about the selection process of the service provider. The following issues were confirmed.

i) One of the difficulties is how to make accurate and adequate calculation of damages as well as identify the damage compensation responsibility. The state management agencies are not allowed to calculate the damages caused by their environmental pollution causing activities; therefore, the laws empower them to select the other institutions, organizations, individuals that can help them to make calculation of damages.

ii) The selection for the most suitable service providers for calculation and determination of damages among various qualified and capable organizations is a civilized manner of competition in the market economy in order to select the organizations and/or individuals that can meet the technical and economic requirements. The birth and existence of bidding aim at ensuring the competitiveness, equality, transparency in selection of the most suitable bidders and the economic efficiency of a package.

iii) To meet the timeliness of the determination of damages, it is recommended that MONRE should organize the selection, licensing of the qualified organization; develop the list of qualified organizations that can provide services of determination of damage compensation liability. This task should be performed by the State, particularly MONRE.

iv) It is necessary to organize selection and develop the List of qualified service providers on calculation of damages and determination of damage compensation liability in each sector that require determination of damages (land, water, ecosystem, the species prioritized for protection) as a base for the competent authorities, in the event of occurred incidents, to select the organizations providing environmental monitoring, analysis and services related to calculation of damages and determination of damage compensation responsibility serving the timely collection of evidence and data to request compensation for environmental damage.

v) Based on the study of theory, current law regulations and analysis of the bidding processes, it is proposed to select the service providers on monitoring, evaluation and measurement services in accordance with the Biding Law and utilize the combined method (techniques, prices combined with prerequisite technical criteria) for evaluating and selecting the service providers.

4.2 Activity 1-2: Study and Define the Functions and Responsibilities of MONRE/VEA, Other Relating Bodies and Local Authorities in RBWEM

4.2.1 Before Restructuring of VEA（Until 2018.5）

(1) Functions and Responsibilities of MONRE, and Organization under MONRE

The XI National Assembly of the Socialist Republic of Vietnam adopted Resolution No. 02/2002/QH11 dated August 5, 2002 on the establishment of the MONRE, followed by Decree No. 91/2002/NĐ-CP dated November 11, 2002 of the government defining the functions, duties, authority and organizational structure of MONRE.

MONRE is the leading central body governing environmental management, according to Decree No. 21/2013/ND-CP of March 4, 2013, defining the functions, tasks, powers and organizational structure of MONRE, replaced with Decree No. 91/2002/NĐ-CP.

Article 121, Chapter XIII LEP 2005, (Law No. 52/2005/QH11) outlines the responsibilities of MONRE for State administration of environment protection. It also mandates that all ministries, ministry-level agencies and other Government bodies to cooperate with MONRE in carrying out environmental protection within their sectors and in establishments under their direct supervision.

Article 141, Chapter XIV, LEP 2014, defines that the Minister of MONRE is responsible to the Government for unifying state management on environmental protection.

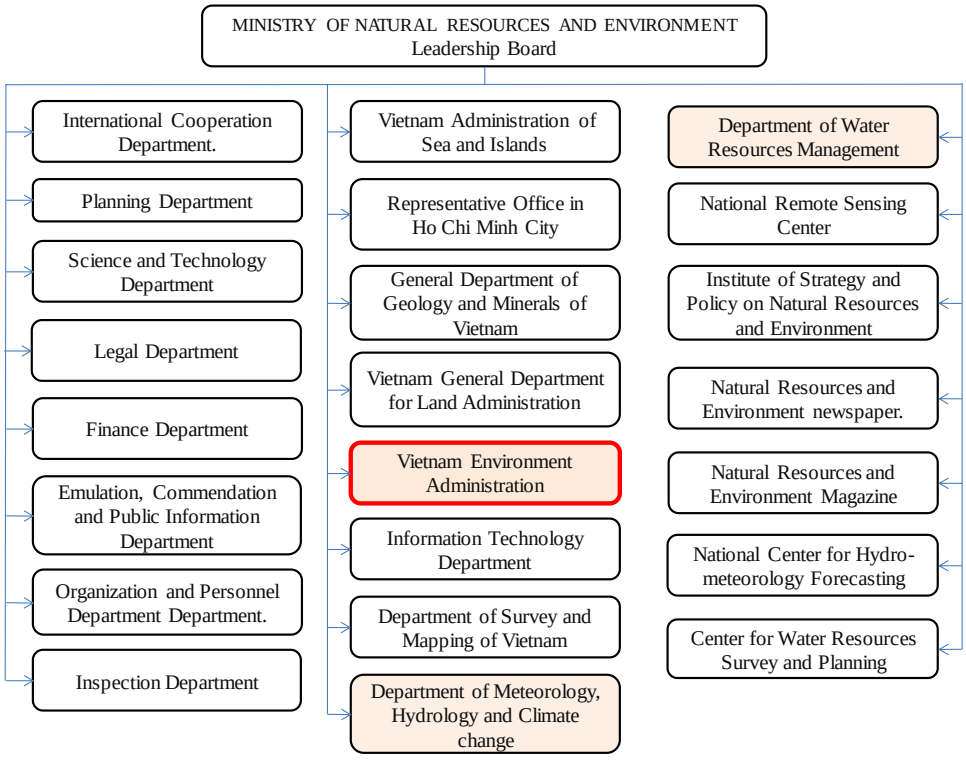
Article 142, Chapter XIV, LEP 2014 mandates that other Ministers, heads of ministerial level bodies shall take charge of and cooperate with the Minister of Natural Resources and Environment in conducting environmental protection activities within their competences and sectors.

In order to guide the implementation of LEP 2005, the Government issued Decree No 81/2007/ND-CP on 23 May 2007 regulating administrative units on environment protection at authorities and state-owned enterprises.

In Article 55, Chapter VI, LEP 2014 (No. 55-2014-QH13), the responsibilities of MONRE in environment protection of river basin are described as follows;

1. To assess the water quality, sediment of transboundary and inter-provincial river basins.
2. To survey and assess the assimilative capacity, define the discharge limits in accordance with the targets of water utilization and publish this information.
3. To promulgate, guide the implementation of environmental technical regulations for water quality and sediment.
4. To promulgate, guide the assessment of assimilative capacity of river basins, the discharge limits of wastewater being discharged into inter-provincial rivers, to recover and improve the environment of polluted river sections.
5. To arrange and conduct the environmental protection activities in inter-provincial river basins.
6. To assess the polluted sources of waste, the extent of damage and arrange pollution treatment for inter-provincial river basins
7. To summarize information on water quality, sediment of river basins and annually report to the Prime Minister.
8. To develop and propose the inter-provincial environmental protection planning to the Prime Minister for approval.

The following shows the organization structure of MONRE. The highlighted agencies are highly related with RBWEM in the project.



Source; JET (Prepared from Article 3, Decree No. 21/2013/ND-CP, Defining the functions, tasks, powers, and organizations and organizational structure of the Ministry of Natural Resources and Environment)

Figure 4-1 Organizational structure of Ministry of Natural Resources and Environment (MONRE)

i) Function and Responsibility of VEA

The function and Responsibility are described in "4.2.2 Functions and Responsibilities of Organizations under VEA."

ii) Function and Responsibility of Department of Water Resource Management (DWRM)

Article 1 Decision No.1686/QD-BTNMT defining functions, responsibilities, competence, and organizational structure of DWRM specifies that DWRM is responsible for consulting MONRE Minister in implementing state management task in the field of water resources, river basin across the national organizing the implementation of water resources public services as prescribed.

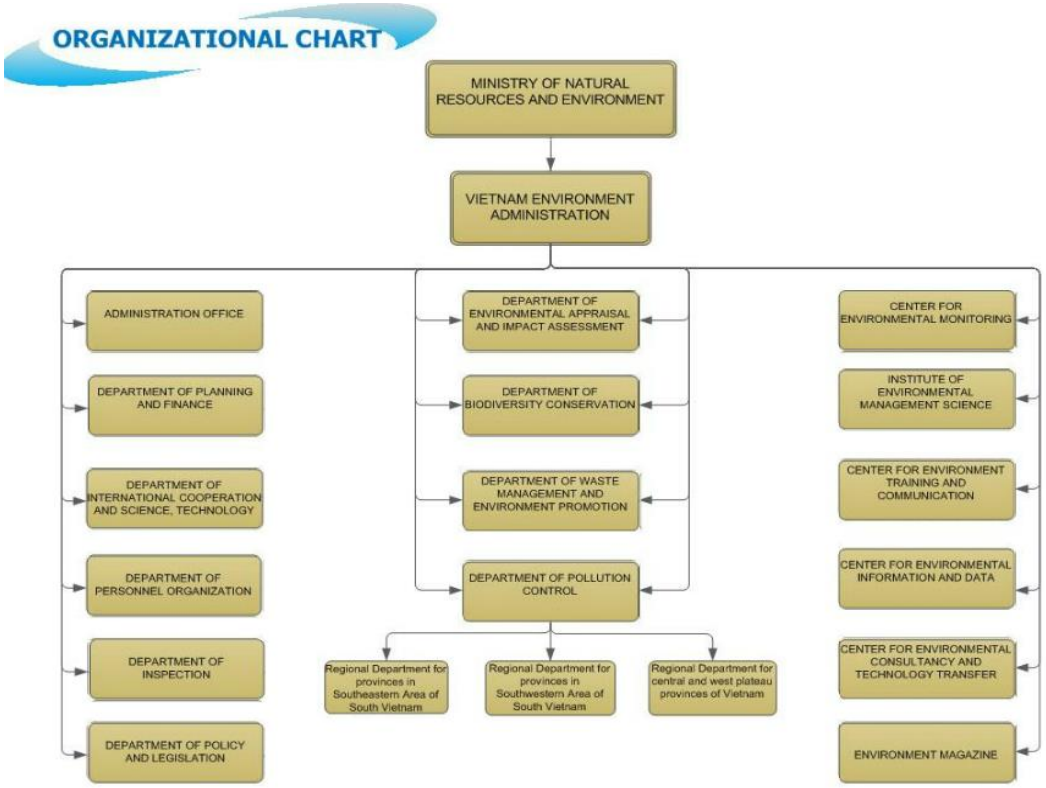
iii) Function and Responsibility of Department of Meteorology, Hydrology and Climate Change (DMHCC)

Article 1 Decision No.1269/QD-BTNMT defining functions, responsibilities, competence, and organizational structure of DMHCC specifies that DMHCC is responsible for consulting, supporting MONRE Minister in implementing state management task in the field of hydrology, meteorology, climate change, and ozone layer protection; providing public services on hydrology, meteorology, climate change, and ozone layer protection as prescribed.

(2) Functions and Responsibilities of VEA, and Organizations under VEA

The Prime Minister issued Decree No. 21/2013/ND-CP dated March 4, 2013 followed by Decision No. 25/2014/QD-TTg dated March 25, 2014 defining the functions, duties and authority of the VEA as follows: VEA is an agency under MONRE, performing the functions of advising and assisting the Minister of Natural Resources and Environment in environmental state management and legal enforcement on a national scale; and managing and implementing environmental public services as prescribed by law. These regulations on functions and authority of the VEA show the roles of VEA as a sub-ministry within a ministry because "VEA has legal status, seal bearing the national emblem, own account and headquarters in Hanoi"

The following Figure shows the organization structure of VEA.



Source; Web page of VEA (URL; http://vea.gov.vn/en/aboutvea/OrganizationalChart/Pages/Organization.aspx)

Figure 4-2 Organization Structure of Vietnam Environment Administration (VEA)

Among the units under VEA, there are several agencies who have function and responsibility related directly to water environmental management, namely: ESI, WEND, Center for Environmental Monitoring (CEM), Department of Pollution Control (PCD).

i) Function and Responsibility of ESI

Function and responsibility of ESI isis described in "4.2.3 Function and Responsibility of ESI".

ii) Function and Responsibility of WENID

Function and responsibility of ESI isis described in "4.2.4 Function and Responsibility of WENID".

iii) Function and Responsibility of CEM

According to Decision No.1511/QD-TCMT on 25 November 2015, the functions and responsibilities of CEM in river basin water environmental protection and management are as follows:

- To get involved in doing investigation and research on finding scientific foundation, legal and practice to serve in establishing legal documents and national policies, strategies, programs, master plans, plans, national standards, national technical regulations, criteria, procedures and technical economic norms for environment as allocation by Director General of VEA.
- To take prime responsibility for managing the environmental monitoring network in the national environmental monitoring system; To chair the implementation of a master plan on the national environmental monitoring system.

- To formulate and deploy the national program of environmental monitoring and quality evaluation as well as the programs of environmental monitoring in inter-regional, inter-provincial and transnational, the environmental monitoring programs at environmentally hotspots or sensitive areas. to coordinate with related agencies or units to form and implement other environmental monitoring programs.
- To get involved in guiding the monitoring units under the ministries, government levels and localities, production establishment, industrial zones and other organizations in the activities of environmental monitoring.
- To research and apply new methods and technologies in environmental monitoring.
- To host in guiding and organizing the activities of testing – calibrating environmental monitoring equipment.
- To implement of environmental analysis; to act as a role of arbitrating a key agency in environmental analyses; to organize inter- laboratory comparison.
- To unify management the monitoring data, environmental quality assessment and investigation; to host in formulating, managing national database on environmental monitoring, information system on environmental monitoring; to build information technology infrastructure, wide area network to collect, manage, process, analyze, synthesize information, monitoring data from automated environmental monitoring stations and environmental monitoring stations of nation, localities and branches; to assess and release information, environmental data; to provide professional skills and technical assistance in managing the environmental monitoring data; to evaluate, predict current status of environmental pollution and load capacity of environmental components in each regions and nationwide.
- To get involved in establishing regulations on installing, managing, utilizing and maintaining environmental database; to get involved in establishing the norms, costs and technical regulations for environmental monitoring activities.
- To research and deploy the application of information technologies, remote sensor technologies, GIS in investigating, monitoring, analyzing, and processing the spatial data which serve for protecting environment activities.
- To get involved, coordinate in implementing the activities:
  a. To formulate database, information system, web portal and VEA and MONRE's information technology application programs;
  b. To inspect, investigate, inventory, assess environment for protecting environment under the allocation of the Director General;
  c. To build and develop standard environmental data and database;
  d. To join in international cooperation in environmental monitoring and its data; to get involved in deploying International Convention, International Agreements in the areas of environment and other areas as allocation of Director General.

iv) Function and Responsibility of PCD

According to Decision No.1521/QD-TCMT on Function and Responsibilities of PCD, November 25th 2014, functions and responsibilities of PCD in river basin water environmental protection and management are as following:

- To take the prime responsible for formulating and assisting Director General in submitting to competent authorities to promulgate legal documents, national policies, strategies, master

plans, plans, five - year and annual plans, programs, projects, tasks in the area of preventing and controlling the pollution of water environment.

- To prevent and control the pollution of water environment.
- To monitor environmental quality and establish environmental technical standards and criteria.
- To control chemical pollution and ensure environmental health.
- To prevent, treat and remedy environmental pollution cause by natural disaster or incidents.
- To get involved in formulating, amending, supplementing the list of establishments which cause serious environmental pollution need be wiped out; confirming the completion of erasing serious environmental pollution establishments; supervising the wipe out of serious environmental pollution establishments; also to get involved in activities of targeted support funds from state budget for wiping out serious environmental pollution establishments in public sector as allocation by Director General.
- To get involved in supervising, confirming the completion of facilities environmental protection, environmental protection measures for operation phase of projects that its environmental impact assessment reports were approved by Minister of MONRE; the implementation of detailed environmental protection schemes of projects that its reports were approved by Minister of MONRE under the provisions of the state law.
- To appraise the environmental protection schemes which are under the MONRE's competence and submit to competent authorities to approve its schemes; to inspect the implementation of its schemes which were approved by competent authorities to review and confirm its completion.
- To get involved in inspecting, supervising the compliance with environmental protection regulations nationwide.
- To get involved in supervising the formulation of the specialized organizations and the training of specialized staff to protect environment in industrial zones, industrial cluster, production, business, services zones according to the state law.
- To perform the schemes, programs, projects at domestic and international cooperation projects in environmental protection as of allocation by Director General.

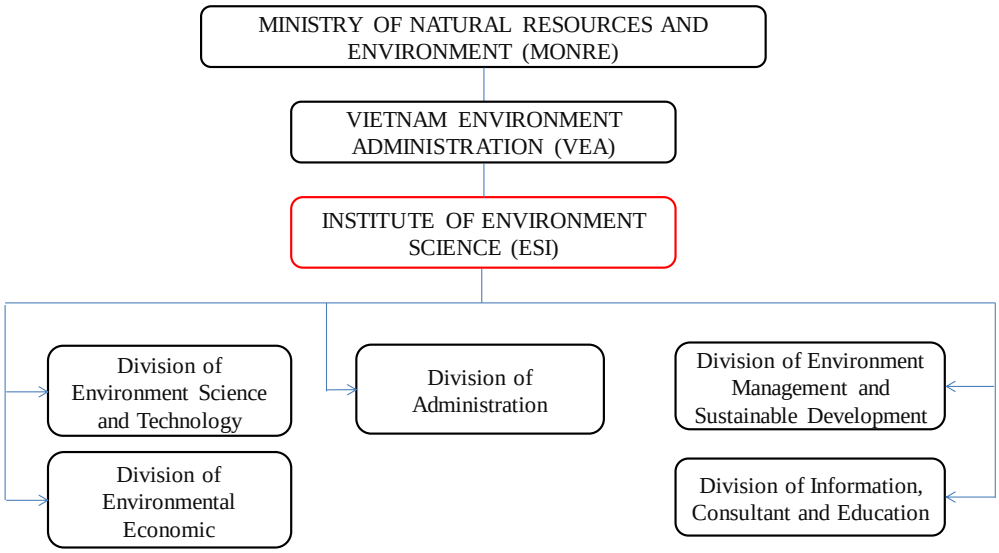
(3) Functions and Responsibilities of ESI

According to Decision No.1506/QD-TCMT on Function and Responsibilities of ESI, the function and responsibility of ESI related with RBWEM are as follows;

- To assist Director General in formulating, proposing the strategies, polices, programs, master plans, plans and solution for environmental protection and sustainable development in Vietnam.
- To formulate, research and deploy programs, schemes, projects and tasks of environmental science; to appraise, approve and inspect programs, schemes, projects and tasks of environmental science as assigned by Director General.
- To do research on scientific foundation and its practice to formulate and improve policies, legal documents, organizational management system for protecting environment in Vietnam.
- To research the policy's mechanisms, economic tools in environmental management; to have cost-estimate methods for environmental goods and services, biodiversity; to identify economical damage caused by pollution, degradation and climate change.

- To research, evaluate, predict, warn the condition of pollution, degradation, loading capacity and vulnerable level of environmental components in each regions; to propose solution to prevent, stop, respond, handle and remedy environmental pollution and incidents.
- To research, determine and issue warning of environmental factors that have high risk for human health; to propose solution to prevent, reduce the effect of its impact to human health; to define compensation liabilities for environmental damage caused by pollution and degradation.
- To research, formulate the indicators of monitoring and to evaluate sustainable development in environment, adaptation of climate change in industrial zones, urban areas, trade traditional villages, rural areas, mountainous areas and other areas as the provisions of the state law.
- To research and apply to deploy the scientific and technological advances in protecting environment; to formulate, deploy the pilot models and technological transfer of sustainable production and consumption, clean production, clean and renewable energies usage.
- To build and develop database on environmental science; to coordinate with related units to manage, do statistics, and archive information and documents.
- To formulate and perform the tasks, international cooperation projects on environmental science; to get involved in implementing the other tasks, international cooperation projects as assigned by Director General.

The structure of ESI is shown in the following Figure.



Source; Article 3 of Decision No.1506/QD-TCMT

Figure 4-3 Organization Structure of Institute of Environment Science (ESI)

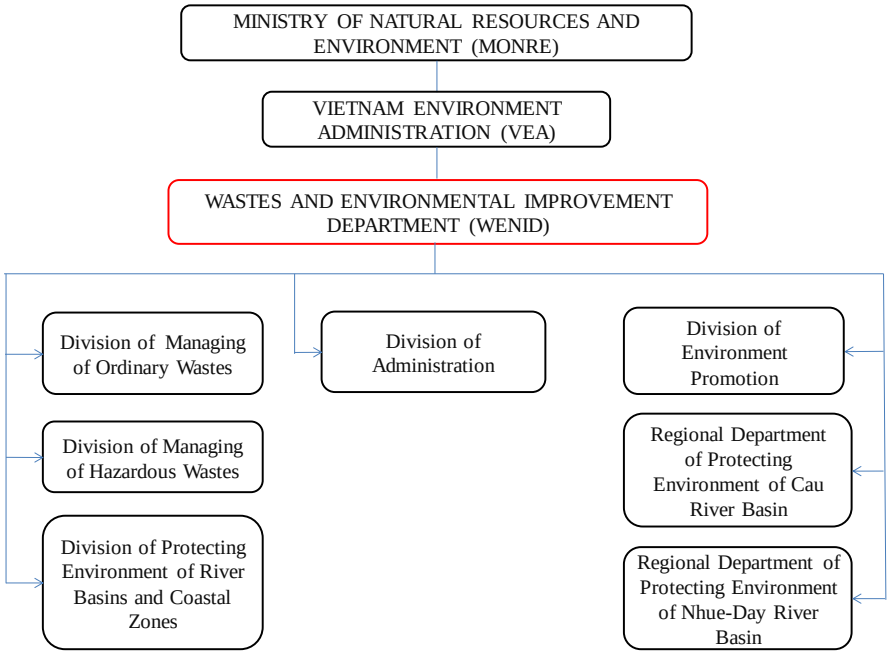
(4) Functions and Responsibilities of WENID

According to Decision No.1515/QD-TCMT on Function and Responsibilities of WENID, the function and responsibility of WENID related with RBWEM are as follows:

- To host and coordinate with related units in formulating environmental legal documents, mechanisms, policies, strategies, master plans, plans, programs, schemes, projects, criteria, procedures, technical – economic norms for ordinary and hazardous wastes management, environmental pollution remediation, environmental degradation, remediation and its improvement; protecting environment of river basin, coastal zones, seas and islands; formulating national standards, national technical regulations on environment as assigned by Director General.

- To guide, examine and implement the regulations, strategies, master plans, plans, programs, schemes, inter-provincial, inter-regional, national projects, national standards, national technical regulations, criteria, procedures, technical – economic norms for environment in such area of: managing ordinary and hazardous wastes; remedying environmental pollution and degradation, improving environmental quality; protecting environment of river basin, coastal zones, seas and islands.
- To coordinate with related units in reviewing, codifying and examining the implementation of legal documents on environment.
- To formulate and participate in formulating, examining and guiding the implementation of policies mechanism for socialization, incentive, support for the activities of managing ordinary and hazardous waste; remedying environmental pollution and degradation; improving environmental quality; protecting environment of river basin, coastal zones, seas and islands.
- To perform the functions and tasks of the Steering Committee on National Target Program on Pollution Mitigation and Environment Improvement.
- To improve the environment.
- To protect environment of river basins, coastal zones, seas and islands:
  a. To investigate, assess, form and implement programs, schemes, projects, environmental protection works which have been approved to remedy and improve environmental quality in river basins, coastal areas, seas and islands in which environment is polluted and degraded that according to the state law/
  b. To formulate, submit to competent authorities to promulgate, inspect and deploy activities of investigating, collecting, assessing and managing the sources of wastewater discharge into the rivers, the environmental hotspots for polluting on the river basins, coastal zones, seas and islands.
  c. To formulate, submit to competent authorities to promulgate, inspect and deploy activities of evaluating the load capacity of rivers; to guide the formulation and management quota for discharging wastewater; to determine the quota for discharging wastewater; to remedy pollution and improve environmental quality in the rivers and sections of rivers.
  d. To formulate, submit to competent authorities to promulgate, inspect and deploy the plan of protecting environment of inter-provincial and inter-regional river basins.
  e. To build and operate information system and database on environment of river basins.
  f. To assist Director General in guiding, performing the coordination among ministries, government levels and localities for settling matter on inter-branch, inter-provincial, transnational pollution of river basins, coastal areas, seas and islands.
  g. To act as standing member of Committees on environmental protection of inter-provincial river basins; to act as key agency of environmental protection of transnational river basins as assigned by Director General.
  h. To guide, inspect and implement the schemes on environmental protection of Cau and Nhue-Day river basins.
  i. To participate in and implement strategies, master plans, plans, programs, projects on responding to climate changes and sea level rise on river basins and coastal areas.
  j. To get involved in professional on inspecting, supervising the compliance with regulations on environmental protection in nationwide.
- To participate in the activities of international cooperation, international treaties and conventions on managing wastes, remedying pollution and improving environment, protecting environment of river basins, coastal zones, seas and islands.

The structure of ESI is shown in the following Figure.



Source; Article 3 of No.1515/QD-TCMT

Figure 4-4 Organization Structure of Wastes and Environmental Improvement Department (WENID)

(5) Functions and Responsibilities of Provincial DONREs

Departments of Natural Resources and Environment (DONREs) were set up at the provincial levels through Decision No. 45/2003/QD-TTg in 2 April 2003. Further, in July 2003, Joint Circular No. 01/TTLT-BTNMT-BNV was issued by the MONRE and the Ministry of Home/Internal Affairs, providing guidelines for the setting up of functions, tasks, powers and organizational structure of agencies designated to assist the municipal People's Committees (i.e., the provincial governments) in addressing issues of natural resource management. According to the Circular, DONRE is an agency of the municipal People's Committees, responsible for supporting the municipal People's Committees in state management of land, water resources, minerals, environment, hydrometeorology and mapping in the province and reporting administratively to the national government. This means that while DONREs are professionally under MONRE, they are structured administratively under, and operate within the organization of the municipal People's Committees.

According to Article 6, Chapter III, Decree No. 81/2007/ND-CP dated 23 May 2007, DONRE shall assist PPsC to implement the functions and authority of state management on environmental protection in provincial area as regulated at items b), c), d), e), and g) of the Clause 1 of the Article122 of LEP 2005, namely:

a) To direct and organize the implementation of strategies, programs, plans and tasks on protection of the environment.

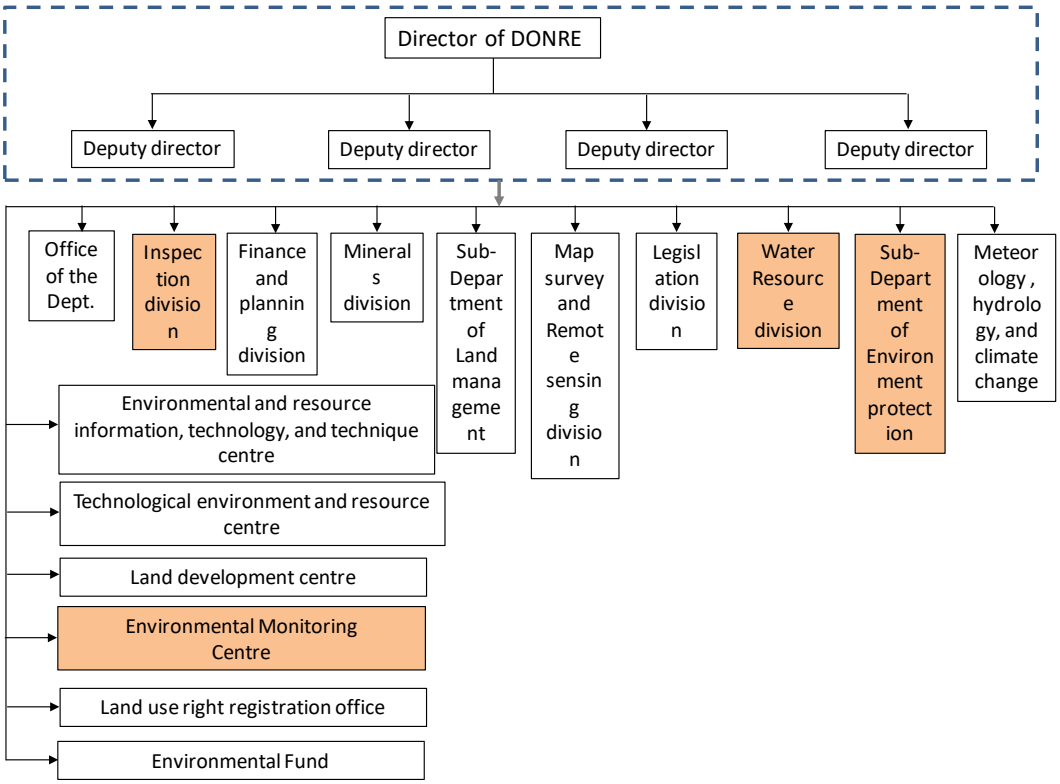
b) To direct the construction and management of local environmental monitoring systems.

c) To direct periodical assessments of the status of the environment.

d) To organize propaganda and education about the law on protection of the environment.

e) To supervise, inspect and deal with breaches of the law on protection of the environment; to resolve disputes, complaints, denunciations and petitions related to environmental protection in accordance with the law on complaints and denunciations and other relevant laws; and to co-ordinate with other provincial people's committees in dealing with inter-provincial environmental issues.

According to Circular No. 03/2008/TTLT-BTNMT-BNV, the organization under DONREs are determined considering the characteristics of provinces or cities. The general structure of DONRE organization is shown in the following Figure.



Source; JET (prepared from http://tnmtbacgiang.gov.vn/index.php/vi/news/Co-cau-to-chuc/CO-CAU-TO-CHUC-BO-MAY-SO-TAI-NGUYEN-VA-MOI-TRUONG-TINH-BAC-GIANG-13/)

Figure 4-5 General Structure of DONRE Organization (referred to Bac Giang DONRE)

The general function and responsibility of highlighted organizations in the Figure above are shown in the following Table.

Table 4-1 Function and Responsibility of Organisation under DONRE Related with RBWEM

Organization	Function and Responsibility
Environmental Protection Agency (EPA)	• To assist the Director of DONRE and Municipal People's Committee in implementing state management tasks in the field of environmental protection in the city area • To chair or participate in domestic and international cooperation projects in the area of environmental protection upon the assignment of Director of DONRE
Inspection Division	• Assisting the Director of DONRE in implementing administrative and specialized inspection tasks in environmental areas
Centre for Environmental Monitoring (CEM)	• Assisting the Director of DONRE in analyzing, organizing the development of natural resource and environmental monitoring network including water quality monitoring network • Organizing the development and implementation of activities, programs in the field of natural resources and environment monitoring
Water Resource Division	• Assisting the Director of DONRE in analyzing, organizing the development of water resource and environmental monitoring network including water quality monitoring network • Organizing the development and implementation of activities, programs in the field of natural resources and environment monitoring

Source; JET

(6) Functions and Responsibilities of MARD

Ministry of Agriculture and Rural Development (MARD) is a governmental agency performing state management functions in the fields of agriculture, forestry, salt production, fishery, irrigation/water services and rural development nationwide, including state management functions with regard to delivery of public service in accordance with legal documents.

According to Decree No.178/2007/ND-CP, the mandate of MARD, in the field of the management of Water resources, are:

a) Govern, guide implementation of legal documents of water resources, dykes; prevent sanitation effects.

b) Govern, guide implementation of water resource strategies and master plans. strategies of natural disaster mitigation upon approval of the Prime Minister.

c) Take a leading role in setting up water resource master plans of reservoirs serving agriculture and socio – economic sectors.

d) Approve master plans of dike and hydraulic works related to up from 2 provinces serving prevention of flush flooding, floods, drought, sanitation, landslides along riversides and coastal areas, water supply and drainage in rural areas.

e) Announce and perform governance, guidance, inspection and making comprehensive reports responsibilities for implementation of strategies, master plans, fishery development plans approved nationwide.

f) Propose to the Prime Minister and mobilize materials, tools for prevention and effects mitigation of floods, droughts, waterlogging, solve incidents of hydraulic works. govern slowing floods, operate big reservoirs based on assignation and decentralization.

g) Govern decentralization for provincial People's committees on approval of water resource and dike master plans and flood prevention master plans within provincial area.

h) Issue, monitor and inspect implementation of national technical standards, processes, socio – economic cost norms in building, exploitation and protection of water resource works and dike system, floods, typhoons, waterlogging, drought and water supply and drainage in rural areas.

i) Regulate loading capacity and transportation certificate for vehicles moving in dikes.

j) Govern, guide, inspect implementation of specific regulations on emergency situation needed to slow floods, safe emigration. ensure people's lives and production, subsidize people.

k) Make decisions on investment in, upgrading and consolidating dikes, hydraulic works in mandated areas nationwide with state fund provided through the Minister.

According to Article 142, Chapter XIV of LEP 2014, the Minister of MARD shall actively coordinate with the Minister of MONRE, Ministers, heads of ministerial level bodies and chairpersons of PPCs of provinces to organize the implementation of law enforcement on environmental protection in production, importing, exporting, use of chemicals, plant protection chemicals, veterinary drugs, fertilizers, waste substances in agriculture and other activities in management.

(7) Functions and Responsibilities of MOIT

Ministry of Industry and Trade (MOIT) is a government agency, performing the function of state management of industry and trade, including the sectors of engineering, metallurgy, electricity, new energy, renewable energy, oil and gas, chemicals, industrial explosives, mining industry and mineral processing, consumer goods, industrial food processing and other industrial, commercial and domestic markets, export and import, border trade and so on.

The list of industries managed by MOIT demonstrates that MOIT holds enormous responsibility for environmental pollution caused by the above industries.

According to the Decree No. 95/2012/ND-CP dated November 12, 2012 of the government stipulating the functions, duties, authority and organizational structure of the MOIT, regarding environmental management works, MOIT holds the following responsibilities and authority:

- Providing guidance, supervising and carrying out inspection on the implementation of the provisions of the law on industrial safety techniques and environmental protection under the State management of the Ministry (Article 2, Section 8d).
- Providing leadership and coordinating with the Ministry of Natural Resources and Environment and other ministries involved in directing the development of environmental industries as stipulated by law (Article 2, Section 8đ).
- Taking the main responsibility, to coordinate with MONRE, relevant Ministries, branches in drawing up plans on minerals exploration, exploitation, processing and using. to implement strategies, plans on minerals exploitation, processing and use as they are approved by competent authorities (Article 2, Section 13c).
- Providing direction, guidance, inspection and supervision to obeisance of regulations, economic and technical norms, technologies, safety and sanitation, and environmental protection in mining and minerals processing (Article 2, Section 13d).

According to Article 142, Chapter XIV, LEP 2014, the Minister of Trade and Industry shall actively coordinate with the Minister of MONRE, Ministers, heads of ministerial level bodies and chairpersons of the people's committees of provinces to handle industrial establishments causing serious environmental pollution under management authority, develop environmental industries and organize the implementation of law enforcement on environmental protection in management.

(8) Functions and Responsibilities of Other Ministries

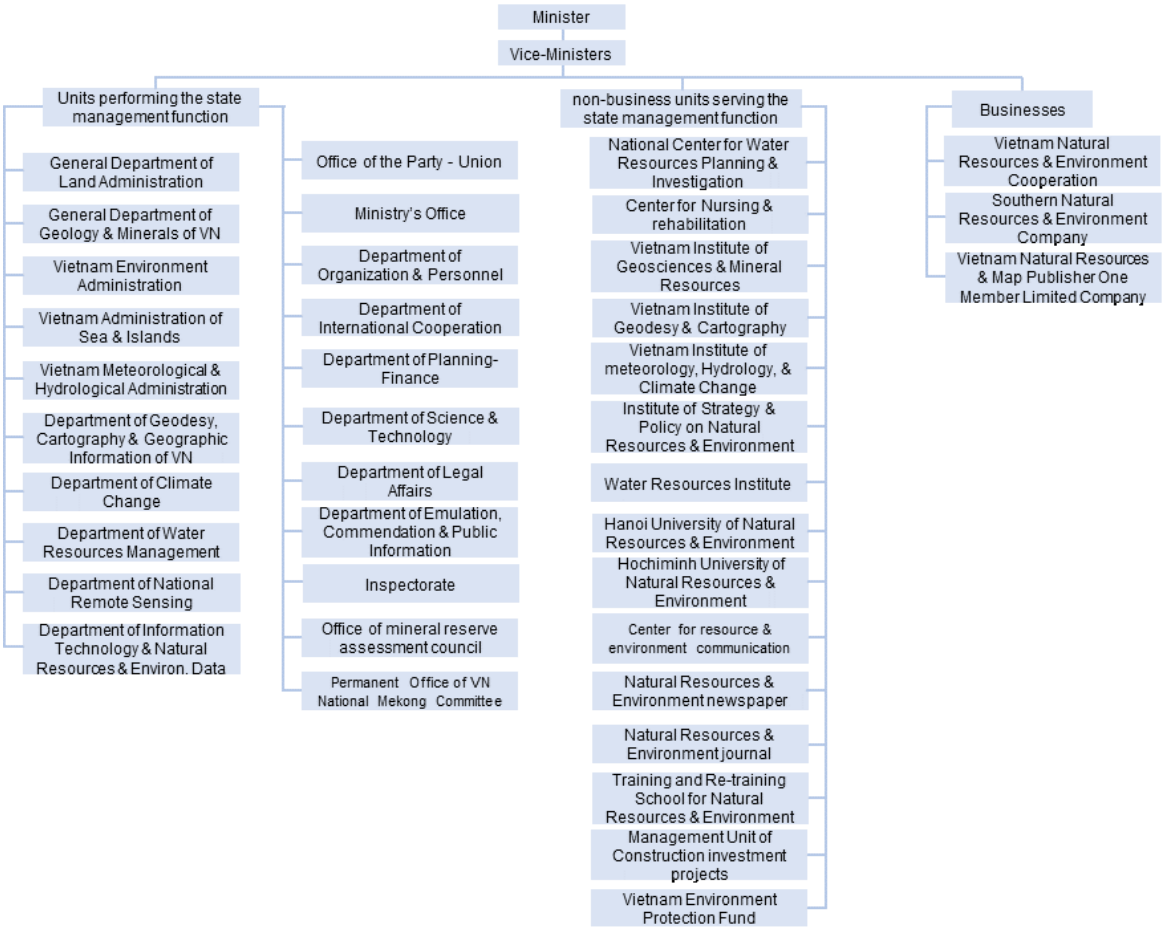
According to Article 142, Chapter XIV, LEP 2014, the followings are the functions and responsibilities of the Ministers of other ministries in the field of environmental protection.

- The Minister of Construction shall actively coordinate with the Minister of Natural Resources and Environment, Ministers, heads of ministerial level bodies and chairpersons of PPCs to organize the implementation of law enforcement on environmental protection in such construction activities as infrastructural structures of water supply, water drainage, solid waste and urban waste water treatment, centralized service production area, construction material production bases, trade villages, centralized rural residential area and other activities in the area of management.
- The Minister of Planning and Investment shall actively coordinate with the Minister of Natural Resources and Environment, Ministers, heads of ministerial level bodies and chairpersons of PPCs to meet requirements of environmental protection in the strategy, general planning and plan of social-economic development of the country, region, project, works under authorities of the National Assembly, Government, Prime Minister, working to attract investment and organizing the implementation of law enforcement on environmental protection in the area of management.
- The Minister of Health shall actively coordinate with the Minister of Natural Resources and Environment, Ministers, heads of ministerial level bodies and chairpersons of PPCs to organize the implementation of law enforcement on environmental protection in the areas of health, food hygiene safety, burial and cremation activities; organizing statistics of waste sources, evaluation of pollution degree, treatment of medical waste from hospitals, medical institutions and other activities in the area of management.
- The Minister of Transport shall actively coordinate with the Minister of Natural Resources and Environment, Ministers, heads of ministerial level bodies and chairpersons of PPCs to organize the implementation of law enforcement on environmental protection in such construction activities as infrastructural structures of traffic, traffic vehicle management and other activities in the area of management.
- The Minister of Public Security is responsible for organizing, directing activities of environmental crime fighting and ensuring security in the area of environment; mobilizing forces to engage in the activity of coping with environmental incidents in accordance with the law; direct, instruct, examine and investigate the environmental protection tasks by the armed forces within authorities of management.
- The Minister of National Defense actively coordinates with the Minister of Natural Resources and Environment, Ministers, heads of ministerial level bodies and chairpersons of PPCs to organize the implementation of law enforcement on environmental protection in the area of national defense in accordance with the law; mobilize forces to engage in activities of coping, remedying the incident in accordance with the law; direct, instruct, examine, and investigate the environmental protection tasks by the armed forces within authorities of management;
- The Minister of Culture, Sports and Tourism actively coordinates with the Minister of Natural Resources and Environment, Ministers, heads of ministerial level bodies and chairpersons of PPCs to organize the implementation of law enforcement on environmental protection in activities of culture, festivals, sports, tourism, and other activities in the area of management.

4.2.2 After Restructuring of VEA（After 2018.5）

(1) Functions and Responsibilities of MONRE, and Organization under MONRE

On April 4, 2017, the Government issued the Decree No. 36/2017/ND-CP (replacing the Decree No. 21/2013/ND-CP dated March 4, 2013) re-stipulating the functions, tasks, powers and organizational structure of the Ministry of Natural Resources and Environment. According to the Decree No. 36/2017/ND-CP, the MONRE is a Government agency that performs the function of state management of the fields of land, water resources, mineral resources, geology, environment, meteorology and hydrology, climate change, measurement and mapping, integrated management of natural resources and environmental protection of the sea and islands, remote sensing, state management of public services in areas under the Ministry's management. The Decree No. 36/2017/ND-CP has added the function of state management on remote sensing and the adjustment of the phrase "natural resources and environmental protection" to the function of state management of sea and islands in accordance with the Law on Resources, and Environment of Sea and Island 2015. The full organizational structure of MONRE is shown in Figure 4-6.



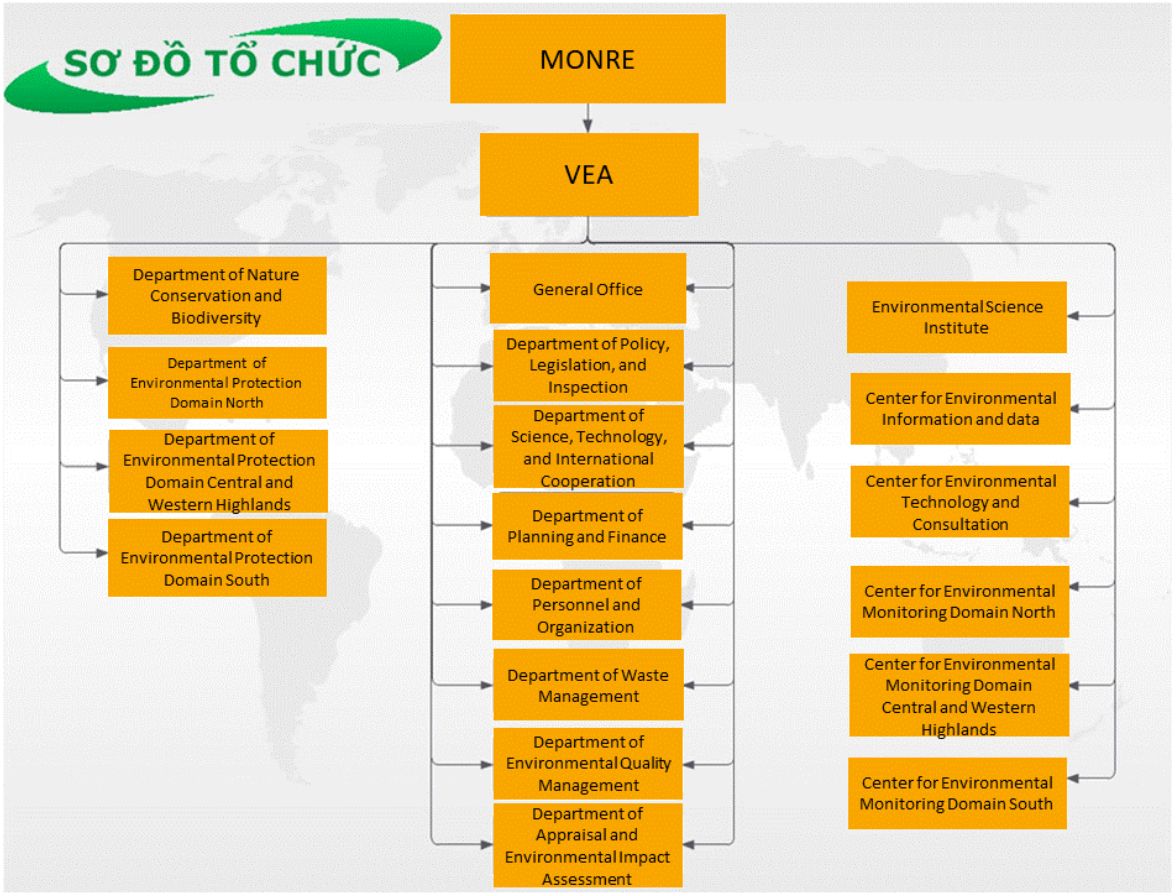
Source: MONRE website: http://www.monre.gov.vn

Figure 4-6 Amended full Organizational Structure of MONRE.

Because the LEP 2014 is still effective, the functions and responsibilities of MONRE are remained as described in Article 55 of Chapter VI; Article 141, Article 142 of Chapter XIV as well as summarized at above section 4.2.1.

(2) Functions and Responsibilities of VEA, and Organizations under VEA

On March 12, 2018, the Price Minister issued the new Decision No. 15/2018/QD-TTg (replacing the Decision No. 25/2014/QD-TTg dated March 25, 2014) re-stipulating the functions, tasks, powers and organizational structure of the VEA. The amended organizational structure of the VEA is shown in Figure 4-7.



Source: VEA website: http://vea.gov.vn

Figure 4-7 Amended Full Organizational Structure of VEA.

Pursuant to the Decision No. 15/2018/QD-TTg, Position and the functions of VEA are: (1) performing the function of advising, assisting the Minister of MONRE in state management and law enforcement for protection of environment and biodiversity in the whole country; governance and organization of implementation of public service activities under the state management scope of the General Department according to the provisions of law. (2) VEA has its legal status, seal, bank account as well as head office at the Hanoi city.

(3) Functions and Responsibilities of ESI

Following up the restructure of VEA under the Decision No. 15/2018/QD-TTg, the main functions and responsibilities of ESI have been redefined by the MONRE in the Decision No. 1319/QD-BTNMT dated April 26, 2018 as follows:

- To research scientific and practical basis for the formulation of national policies, laws, standards, and technical regulations on environment, management organization system for environmental protection in Vietnam.

- To study policies, economic tools in environmental management, methods of valuing values of environment and biodiversity; identify social and economic losses caused by environmental pollution, environmental degradation and climate change.
- To research, evaluate the developments and forecast the trends of interaction between economic, social and environmental activities; environmental issues and international economic integration; global environmental and Vietnam environmental issues.
- Research, evaluate, forecast, and warn the pollution, degradation, load capacity, and extent of environmental component damage by region; propose solutions to prevent, respond to, handle, and remedy the environmental pollution and environmental incidents.
- To research, identify, and warn the environmental factors that are at high risk to human health; propose solutions to prevent and minimize the impact of environmental pollution on public health; determine responsibility for compensation for environmental damage caused by pollution and degradation.
- To research and propose models of sustainable development, solutions for conservation, environmental restoration and sustainable use of resources in exploitation, production and consumption; research and implement programs, trial models on sustainable production and consumption, environmentally friendly, using clean energy and renewable energy.
- To research and develop the monitoring and evaluation indicators of sustainable environmental development, climate change adaptation according to industrial zones, urban areas, craft villages, rural areas, mountainous areas and other areas according to regulations.
- To research, apply, and implement the scientific and technological advances in the field of environmental protection, and environmental technology development and transfer.
- To Build and develop the database on environmental science; coordinate to implement the management, statistics, and storage of information and data.
- To cooperate with domestic and foreign research and training institutions in training and fostering environmental science human resources in accordance with law.
- To take and participate in the implementation of international cooperation programs and projects in the field of environment as assigned by the General Director.
- To perform the service and consulting activities on environmental science and technology according to the provisions of law.

(4) Functions and Responsibilities of Department of Waste Management - WMD (former WENID)

Following up the restructure of VEA under the Decision No. 15/2018/QD-TTg, the main functions and responsibilities of WMD have been redefined by the MONRE in the Decision No. 1315/QD-BTNMT dated April 26, 2018 as follows:

- To submit to the General Director:
  + Law projects, draft resolutions of the National Assembly. ordinance projects, draft resolutions of the Standing Committee of the National Assembly. draft decisions and resolutions of the Government. draft decisions and directives of the Prime Minister. draft directives, decisions, and circulars of the Minister of MONRE and other legal documents on pollution source control, handling establishments causing serious pollution. waste management. prevent and respond to environmental incidents as assigned by the General Director.
  + Draft strategies, planning, inter-provincial, regional and national plans on pollution source control, handling establishments causing serious environmental pollution. waste management. prevent and respond to environmental incidents as assigned by the General Director.

+ Drafting regulations, standards, technical processes, economic-technical norms, technical guidance on pollution source control, handling establishments causing serious environmental pollution. waste management. prevention and response to environmental incidents.

+ List of projects and facilities at high risk of environmental pollution. list of establishments causing serious environmental pollution. list of biological products used in pollution prevention and reduction and treatment of wastes, lists of biological preparations causing environmental pollution banned from import, and list of discarded materials permitted for import. list of hazardous waste in accordance with the law.

- Assist the General Director:

+ To guide and inspect the implementation of legal documents, strategies, planning, and plans on pollution source control, hand establishments causing serious environmental pollution; waste management; prevent and respond to environmental incidents under the management of the VEA;

+ To monitor and synthesize reports on pollution source control, hand establishments causing serious environmental pollution; waste management; prevent and respond to environmental incidents nationwide according to law provisions.

+ To organize the implementation of registration, certification, recognition, issuance, re-issuance, adjustment, extension, and revocation of hazardous waste treatment licenses and types of permits, certificates, certifications, other certificates on control of pollution sources, handling establishments causing serious environmental pollution. waste management. preventing and responding to environmental incidents according to law provisions.

- To take lead and coordinate giving comments on strategies, planning, plans, projects, tasks on pollution source control, handling establishments causing serious environmental pollution. waste management. preventing and responding to environmental incidents of ministries, branches and localities; prepare content to answer questions, comments, recommendations of voters and National Assembly delegates on pollution source control, waste management, prevention and response to environmental incidents as assigned by the General Director.

- To guide and inspect the work of cataloging, the thorough handling and certification of the complete handling of seriously polluting establishments according to law provisions; the implementation of environmental criteria in new rural construction. registration of hazardous waste source owners; hazardous waste management activities nationwide; the recovery and handling of discarded products, destruction of cars and motorbikes of subjects entitled to privileges and immunities in Vietnam according to law provisions.

- To guide on the control of pollution sources during construction and trial operation of investment projects; the control of pollution sources from production, business and service activities including industrial parks, export processing zones, hi-tech parks, industrial clusters and trade villages; Environmental protection work for chemicals, plant protection drugs, veterinary drugs, used ship demolition, import of scraps for production materials under its jurisdiction; environmental incident prevention and response according to the provisions of law.

- Technical guidance, process of classification, storage, collection, transfer, transportation, preliminary processing, reuse, recycling, co-processing, processing and recovery of energy from domestic solid waste, common industrial solid waste, and hazardous waste; Classification of solid waste at source and organization of pilot implementation, review and replication of solid waste classification model at source as prescribed by law.

- Synthesis and forecast of pollution sources and establishments causing serious environmental pollution; on the situation of arising, collecting, and treating domestic solid waste, ordinary solid waste and hazardous waste nationwide.

- To implement programs, projects, tasks and use of state budget capital and aid for pollution source control, handling establishments causing serious environmental pollution; waste management; prevent and respond to environmental incidents as assigned by the General Director.

(5) Functions and Responsibilities of Department of Environmental Quality Management - EQMD (former PCD)

Following up the restructure of VEA under the Decision No. 15/2018/QD-TTg, the main functions and responsibilities of EQMD have been redefined by the MONRE in the Decision No. 1306/QD-BTNMT dated April 26, 2018 as follows:

- To submit to the General Director:
  + Law projects, draft resolutions of the National Assembly; ordinance projects, draft resolutions of the Standing Committee of the National Assembly; draft decrees and resolutions of the Government; draft decisions, and directives of the Prime Minister; draft directives, decisions, and circulars of the Minister of Natural Resources and Environment, and other legal documents on monitoring, management and improvement of environmental quality as assigned by the General Director.
  + Draft strategy, planning, inter-provincial and regional plans on monitoring, management and improvement of environmental quality as assigned by the General Director.
  + Draft regulations, standards, technical processes, economic and technical norms, technical guidance on monitoring, management and improvement of environmental quality.
- Assist the General Director:
  + To guide and supervise the implementation of legal documents, strategies, planning, plans on monitoring, management and improvement of environmental quality under the management scope of the VEA.
  + To monitor, synthesize, and report on the monitoring, management and improvement of environmental quality throughout the country.
  + To organize the registration, certification, recognition, issuance, re-issuance, adjustment, extension, and revocation of certificates of eligibility for environmental monitoring, environmental rehabilitation and remediation plans for residues; Certificate, re-certification of eco-label for environmentally friendly products; Certificate of environmentally friendly nylon bags and other licenses, certificates, certifications of monitoring, management, and improvement of environmental quality in accordance with the law and assigned by the General Director.
- To assist the General Director in coordinating the management of environmental quality in river basins and coastal areas; guide and inspect the implementation of river basin environmental protection projects in accordance with law.
- To guide the control of residues of chemicals, plant protection drugs, veterinary drugs, organic substances that are difficult to decompose, dioxins in the environment according to the provisions of law.
- To guide and supervise the monitoring and evaluation of the current situation, changes in soil, water, air quality, transboundary pollution, acid rain; the monitoring of environmental quality trends in key economic regions, areas concentrated with multi sources of pollution, large waste sources, river basins, coastal areas, urban and rural areas, residential areas, public area; the assessment of the load capacity of environmental pollutants in accordance with the law.

- To guide and inspect the investigation, assessment, zoning and warning of environmental polluted and degraded areas; research, investigation, and assessment of environmental health; the investigation, determination of damage to the environment, calculation of environmental damage and determination of compensation liability for the environment caused by pollution and degradation; the treatment, renovation and restoration of the environment in areas polluted with residues of toxic chemicals, dioxins, and plant protection chemicals; improving environmental quality in urban areas, residential areas, rural areas, mountainous areas, economic zones, river basins, and coastal areas according to the provisions of law.
- To take lead and coordinate with units directly under the VEA in elaborating and announcing environmental status reports and environmental reports in accordance with law.
- To take lead and coordinate giving comments on strategies, planning, plans, projects, and tasks on monitoring, management and improvement of environmental quality; prepare content to answer questions, comments, recommendations of voters and National Assembly delegates on monitoring, management and improvement of environmental quality as assigned by the General Director.
- To implement programs, projects, tasks, using state budget and aid capital for environmental monitoring, management and improvement of environmental quality as assigned by the General Director.

(6) Functions and Responsibilities of Provincial DONREs

Main functions and responsibilities of Provincial DONREs are precisely summarized in above parts of section 4.2.1. The LEP 2014 stipulated in detail the functions and responsibilities of PPC regarding the environmental protection in river basin by the Article 54; Clause 4, Article 56; Clause 2, and Article 125.

(7) Functions and responsibilities of MOIT, MARD, and some other relevant ministries

Main functions and responsibilities of MOIT, MARD, and some other relevant ministries are precisely summarized in above parts of section 4.2.1.

4.3 Activity 1-3: Prepare a Program of Training Courses and Conduct Training

The training program on Output-1 was focused on obtaining practical knowledge concerning developed Circulars/ Guidelines such as management of RBWEM and /or establishing a water quality model. The training courses were called to ATC.

4.3.1 Preparation of Advanced Training Program

The RBWEM requires sufficient technical and management skills and knowledge of administrative enforcement on various kind of steps such as planning, implementation, supervision, coordination, and reporting. As for circular developments, it is required to have advanced knowledge to develop circulars. Therefore, JET prepared a plan for ATC.

For the PPs implementation, JET prepared a plan to have BTC under the activity of Output-2 as described on section 5.2 of this report. The other hands, Main objectives of ATC of Output-1 are to strengthen capacity of planning, implementation, and management of RBWEM based on the basic skills and knowledge obtained through the Project activities. The ATC included the activities of the finalizing of circulars or developing of Action Plan as ATC-2 and ATC-3. In this section, ATC-1, ATC-2, and ATC-3 were described.

Table 4-2 Overall Training Program related to Output-1

Training	Purpose and Contents	Duration
Basic Training Course (BTC)		
BTC-1-1	Lecture on total pollution load control for RBWEM in Japan	September 2016
Advance Training Course (ATC)		
ATC-1-1	Lecture on understand approach of total pollution load control	June. 2017 - Sep 2017

Source: JET

The prepared training program and schedule were discussed in PMU meeting, and approved it. JET prepared the detail schedule of each training courses and confirmed to C/P participants for conduct the training.

4.3.2 Implementation of Training Program

(1) Implementation of BTC-1-1on Introduction of Total Pollution Load Control for RBWEM in Japan

To provide Japanese experiences on RBWEM with total pollution load control approach, BTC-1-1 was focused on RBWEM conducted in Japan. The training contents is shown in Table 4-3. The number of participants in each organization and main questions and comments are shown in Table 4-4.

Table 4-3 Plan of BTC 1-1

No.	Training title	Concerned division	Related circular	Duration
1st Training	Lecture on total pollution load control for RBWEM in Japan	regarding policy making, and making monitoring plan	Circular-2	September 2016

Source: JET

Table 4-4 Implementation Results of BTC 1-1

No.	Results	VEA	Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
1st Training	Number of participants	22	43	18	14	8	20	20	20
	Training date	2016/9/23	2016/9/5	2016/8/31	2016/9/21	2016/9/14	2016/9/12	2016/9/13	2016/9/15
	Main questions and comments	How to assure the monitoring data in Japan Methodology of evaluation of monitoring data in Japan							

Source: JET

(2) Implementation of ATC-1-1 on Introduction of Case Study of Total Pollution Load Control System in Japan and Discussion on Expected System Applied for Vietnam

ATC 1-1 was focused on understanding of RBWEM by approaching to total pollution load control by introducing of Japanese total pollution load control approach and discussion on how to apply the approach to Vietnam. The training contents is shown in Table 4-5 and the number of participants in each organization is shown in Table 4-6.

Table 4-5 Plan of ATC 1-1

No.	Training title	Concerned division	Related circular	Duration
1st Training	Lecture on understand approach of total pollution load control	Central / provincial / district officers in charge of RBWEM	Circular-2	June, 2017

Source: JET

Table 4-6 Implementation Results of ATC 1-1

No.	Results	VEA		Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
1st Training	Number of participants	4		7	11	6	7	5	8	6
	Training date	2017/6/22		2017/6/17			2017/6/6	2017/6/7	2017/6/8	2017/6/9

Source: JET

For conducting RBWEM with total pollution load control approach, it was considered to be necessary to introduce different management system from conventional system such as provincial management individually, and to clarify what management system were necessary for DONREs and central government. To discuss on the management system to be developed, an questionnaire to trainees for confirming opinions regarding river basin management was implemented when conduct ATC-1-1.

Although the respondents of this questionnaire did not include all relevant departments concerning RBWEM, the answers showed the items to be considered for river basin management as described the following section. In the section, answers related to expected function of RBOs are described, and all results of questionnaire are attached in Attachment 9.

a) Number on Answers

The number of answers is shown in Table 4-6. Among 54 participants of ATC-1-1, 23 participants answered to questionnaire, including central and local governmental officers mainly comprising of provincial DONREs' officers.

Table 4-7 Participants on Questionnaire

Province Name	VEA	Thai Nguyen	Bac Giang	Bac Ninh	HCMC	Binh Duong	Dong Nai	BRVT	Total
Number	4	1	0	0	2	4	6	6	23

Source: JET

b) Opinions and Trends on Answers

Table 4-7 shows the answers of questionnaire on expected functions of RBOs, which were collected from trainees of ATC-1-1 after providing lectures on Japanese total pollution load control system. Respondents expected that RBOs would contribute to developing and operating common system for total pollution load control, such as leading and coordinating discharge quota allocation in river basin level, or zoning of river section by environmental standard and distribution of wastewater discharge sources. In addition, RBOs also expected to conduct activities contributing to applying detail/ practical parameters for technical examination of pollution load, such as survey for applying individual pollution load unit.

Based on the answers to the questionnaire, it was considered that C/Ps basically understood well on requirements and necessary actions for river basin management. The collected answers were used for preparing the Guideline for Coordination Mechanism for RBWEM under Output-1 and Overall Plan under Output-3.

Table 4-8 Answers Regarding Expected Function of RBOs

Expected function of RBOs	Conducting public hearing on RBWEM	Planning survey for technical examination such as survey for setting pollution load unit	Establishment of technical committee for allocating discharge quota	
	17	11	20	
	Trading of discharge quota among province	River section zoning by environmental standard for environmental conservation	River section zoning for pollution load control (industrial zone, regulation of development, etc.)	
	17	14	21	
	Allocation of discharge quota	Preparation of Action Plan for reducing discharged pollution load	Periodical review of pollution load reducing target based on monitoring of achievement	Total of Answers
	18	18	19	155

Source: JET

4.4 Activity 1-4: Prepare the Final Draft Guideline/Technical Report on Coordination Mechanism for RBWEM

Circular-1 is "The Draft Circular on coordination mechanism for river basin water environmental management (RBWEM)". VEA and JET discussed on way of regulating administrative procedures in Circular-1 to be developed by the Project in line with Law on Promulgation of Legislative Documents (No.80/2015/QH13). Through the discussion with C/P side and DWRM, JET confirms that this matter is very important but include difficulties on connection and demarcation between LEP and LWR. Based on the results of discussion, both sides agreed that the legislative document for coordination mechanism would be prepared by not as a circular, but also as a guideline, and to focus on coordination for examining loading capacity in river basin level.

As a result of discussion with VEA and target DONREs through TF meetings, the process for conducting coordination was proposed as following description and shown in Figure 4-8.

The Steps for coordinating consensus for loading capacity assessment in river basin level are made in 4 phases:

- Preparatory Phase (Step 1)
- Common Understanding Formulation Phase (Step 2 and 3)
- Identification and Allocation Phase (Step 4 and 5)
- Post Identification and Allocation Phase (Step 6).

Step 1 is the Preparatory Phase to define a target river basin and pertinent PPCs for TPLC and to mobilize resources for establishing decision making and secretariat bodies.

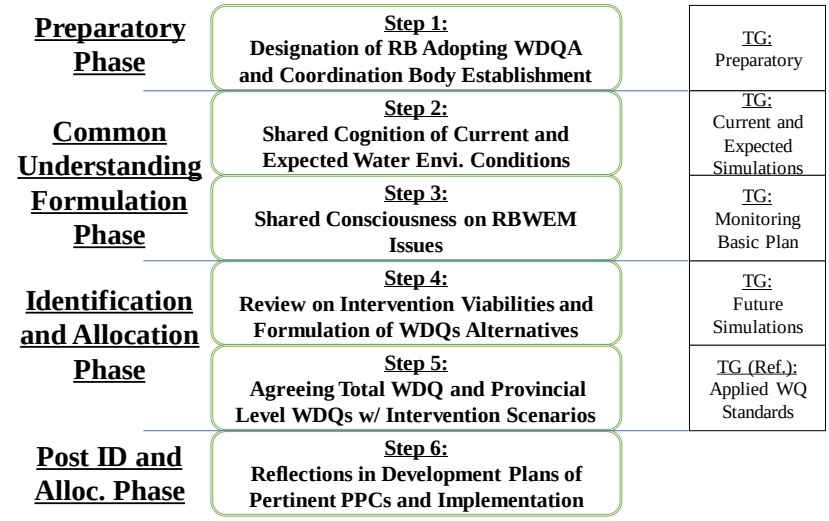
Step 2 and 3 comprise Common Understanding Formulation Phase. The common understanding means shared understanding among the stakeholders of RC decision-making which are mainly done by the pertinent PPCs. The Phase embraces the activities to collect necessary data and information, to present them

in organized manner, to attain proper understanding of situations regarding water environmental conditions and issue(s) in the river basin, and to attain consensus on the subject issue(s) for RBWEM. The activities involve analyses and use of simulation model prepared accordingly to the TG on the RBWEM situation.

Step 4 and 5 constitute Identification and Allocation Phase. Step 4 is integral part for formulating the alternatives for the collective decision-making or consensus on the identified and agreed provincial RCs by the pertinent PPCs in Step 5.

It includes the activities in TG to simulate the WQ conditions at the target year with application of extra intervention measures. Formulation of intervention scenarios and respective simulations to provide sound references for establishing appropriate target WQs and to identify and to allocate associating provincial RCs with the WQs to be adopted in accordance with TG.

Step 6 as Post Identification and Allocation Phase embraces PPCs' actions on integrating adopted scenarios for achieving respective RCs into their development plans and their implementation, and monitoring and evaluation (M&E) for the planning and implementation activities.



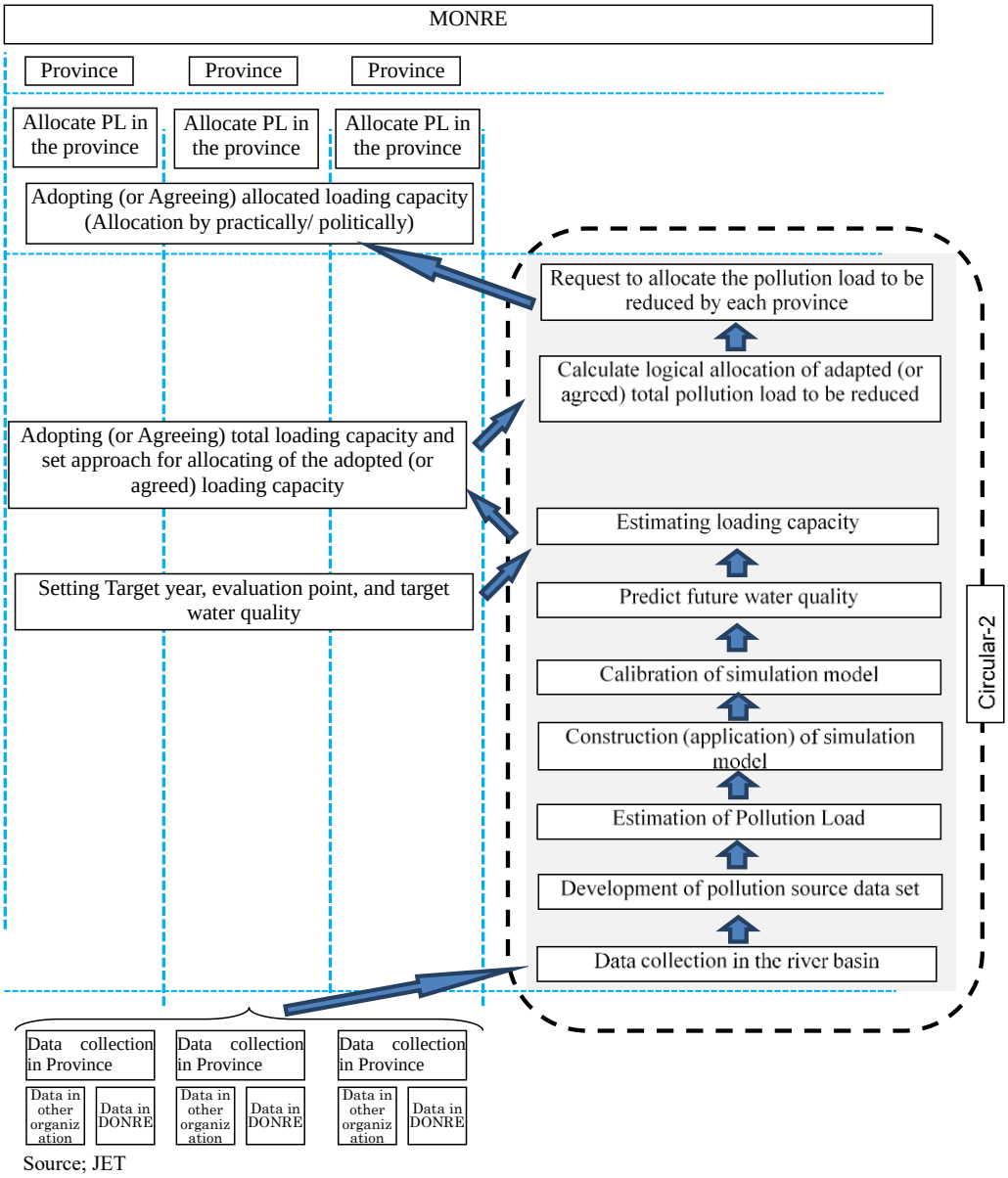
Source; JET

Figure 4-8 Steps of Coordination for Obtaining Consensus on Loading Capacity Assessment in River Basin Level

4.5 Activity 1-5: Prepare the Draft Circular on Assessment of Loading Capacity

4.5.1 Framework of Circular-2

The framework of Circular-2 was discussed among JET and C/P. JET and C/P agreed to prepare the Circular and Technical Guideline through discussion based on the framework.

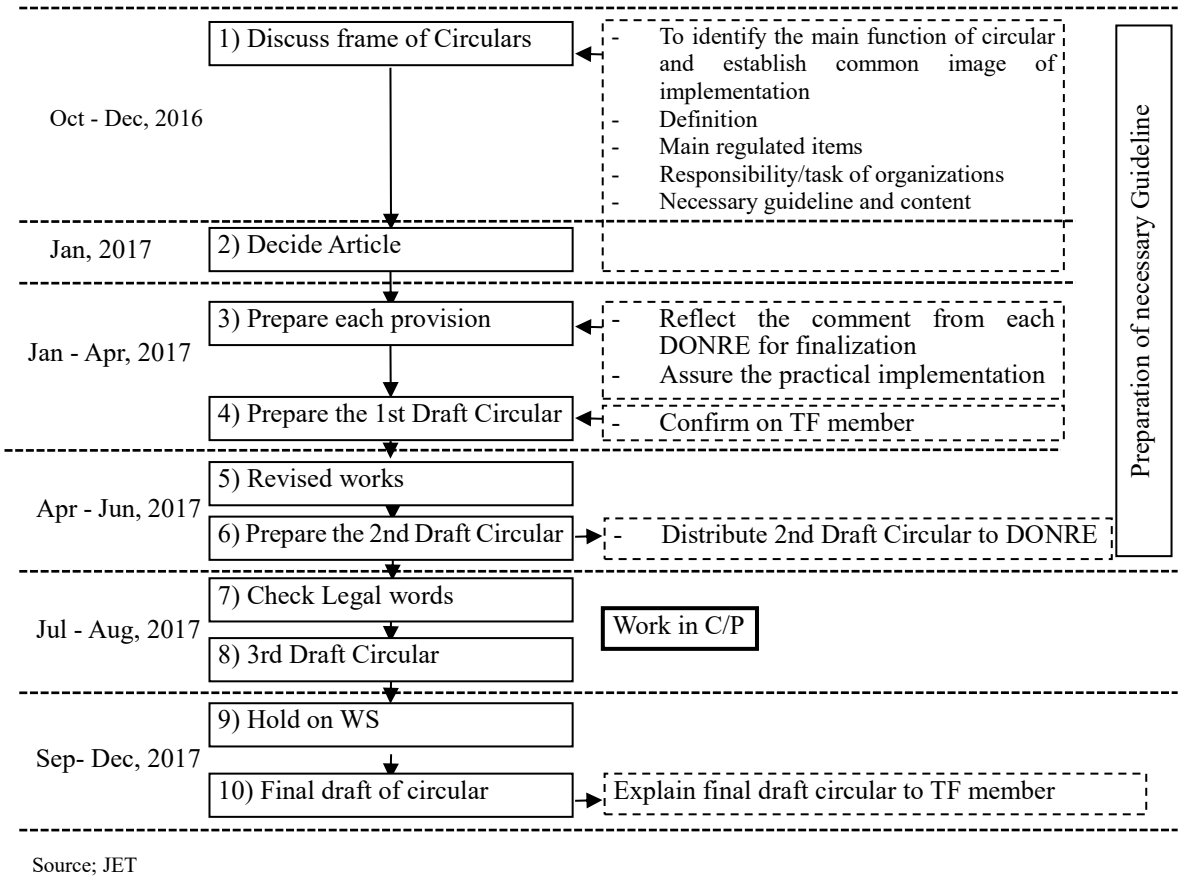


Source; JET

Figure 4-9 Framework of Circular-2

4.5.2 Preparation Schedule for Circular-2

The preparation schedule is shown in Figure 4-10. Circular-2 was prepared from October 2016 to December 2017 with 4 times of technical meetings as mentioned the next section.



Source; JET

Figure 4-10 Preparation Schedule for Circular-2

4.5.3 Discussion Points to Finalize the Circular

C/P side is focusing on technical issues in Circular-2 development. On the technical meeting held on 20 January 2017 and 10 March 2017, following topics were discussed.

(1) Necessary data and the reliability: How to ensure reliability of simulation results. It is difficult to ensure accuracy and reliability of the model. Without precise verification, it is impossible to ensure reliability of model, etc.

(2) Pollution source analysis: What are classification criteria of pollution sources. Considering point sources and non-point sources. Which wastewater discharge volume level, should pollution sources be considered as targeted sources, etc.

(3) Development of Water Quality model: How to construct simulation model, allocating loading capacity, and conducting future assessment. Variations and limitations of models should be estimated closely and reflected to simulation result.

After considering above discussion points, C/P and JET held technical meeting on 27th and 29th June 2017 to finalize the contents and the regulated function on Circular-2, then C/P and JET are confirmed as “draft final Circular-2” (Attachment 10).

In parallel with discussion of contents of Circular-2, JET and C/P discussed to proceed the institutionalization process such as listing to legislative document on MONRE. JET and C/P found that

DWRM also preparing a Circular regarding assessment of loading capacity though the detail approach of assessment of loading capacity is different from the Project approach. The DWRM's circular applied similar method with the proposed method by the Project on calculation manner of loading capacity, but the assessment manner of loading capacity was different, that was not for river basin management, but for providing wastewater discharge license for each wastewater discharge source. JET, C/P and DWRM held several meetings for discussing this issue. As the results of discussions among JET, C/P and DWRM, the draft Circulars regarding assessment of loading capacity, prepared by DWRM and the Project, were integrated into one Circular under the policy of MONRE to avoid enforcing similar circulars at the same time. Finally, the Circular was promulgated as "Circular No.76 2017 TT-BTNMT on Regulating assessment of wastewater receiving capacity and loading capacity of rivers and lakes" as shown in the Attachment 9 of this report.

4.5.4 Preparation of Technical Guideline

The Technical Guideline was prepared and updated to reflect a results of PPs in Cau/ Dong Nai river basins and professional comments from Vietnamese side experts. The Technical Guideline also reflected comments from DONREs on viewpoints of practical calculation manner and reliability of each data, which were obtained at the individual meetings and through TF meeting and workshops.

(1) Discussion and Consultation on Contents of Technical Guideline

In addition to the explanations to each target DONRE through meetings such as TF meetings and workshop, the contents of Technical Guideline were consulted with relevant local experts from different departments/sectors of MONRE and some other ministries. A retreat meeting was held for two days, 15th - 16th September 2017, at Vinh Phuc Province for discussion and consultation of the contents of draft Technical Guideline. The retreat meeting program is shown in Table 4-9 below. Total number of participants was 23.

Table 4-9 Agenda of the Retreat Meeting

Date	15 – 16 September 2017 (Song Hong Hotel, Vinh Yen City, Vinh Phuc Province)	
Theme	- To discuss on finalizing the Technical Guidelines for Calculating Loading Capacity and Discharge Quota (the Guideline) by the national experts, - To ensure Guideline's contents isis an important input of draft Circular No.2, and - To discuss on proposal about way of usage of the Guideline, for better pollution load analysis and loading capacity calculation in future.	
Agenda		
Time	Content	In Charge
1st day		
12:00-13:00	Lunch	All participants
13:00-13:10	Meeting Start #Opening and introduction of participants.	VEA/JET
13:10-13:30	Introduction #Introduction of the background of the Project and the target of "The calculating Loading Capacity and Discharge Quota" #The way of discussion in the meeting # Proposing the selected important items to be discussed and the explanation (JET consideration) based on the comments of Experts.	JET

Time	Content	In Charge
13:30-14:30	Presentation from Each expert (10 minutes maximum for each expert) # Opinion for the river basin water environment management in Vietnam (Situation, difficulties and challenging issues.) # What is necessary to go forward. # Comment for the draft circular and TG. (Constructive ideas and alternative manners are required.)	06 Experts
14:30-14:45	Coffee break	All participants
14:45-17:15	Discussions on selected important items to be discussed (Small group discussion may be considered. 15:15-16:30 Discussion 16:30-17:15 Group Presentation)	All participants
17:15-18:00	Summary of discussion	VEA/JET
18:00-19:30	Dinner	All participants
2nd day		
8:00-8:30	Confirmation of the 2nd day's schedule (Program, Discussion point, etc.)	VEA/JET
8:30-10:30	Discussions on the detail comments and approaches to finalize Step-1 to Step-3 of the Guideline	All participants
10:30-10:45	Coffee break	All participants
10:45-12:00	Discussions on the detail comments and approaches to finalize Step-4 to Step-5 of the Guideline	All participants
12:00-13:30	Lunch	
13:30-14:00	Summaries meeting discussion	All participants
14:00-15:00	Conclusions	VEA/JET

Source; JET

(2) Finalization on Contents of Technical Guideline

The Technical Guideline was submitted to expanding PMU meeting held on 22nd December 2017. The Technical Guideline was acknowledged at the meeting, then it was proposed to be enforced as "VEA Decision" related to Circular 76 by the director of PMU. JET and C/P agreed this proposal.

(3) Institutionalize of Technical Guideline

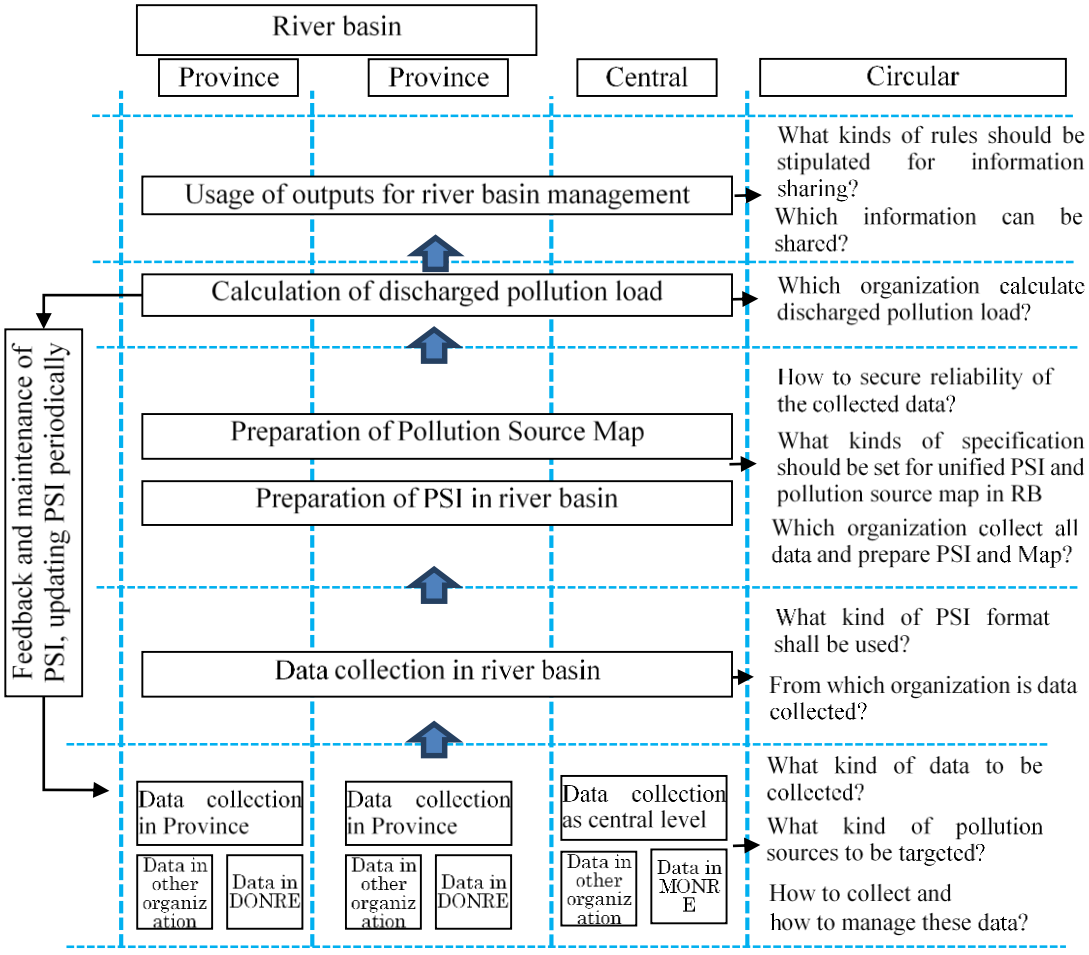
JET and PMU updated the Technical Guideline for meeting to format of VEA Decision, and finalized on September 2018. C/P conduct a series of legalizing process to institutionalize the technical guideline as VEA decision. The VEA decision was promulgated as No.154/QĐ-TCMT on 15th February 2019.

4.6 Activity 1-6: Prepare the Final Draft Legalizing Document on Main Wastewater Discharge Sources for RBWEM

4.6.1 Framework of Circular-3

The JET and C/Ps prepared the draft Circular-3 in 2017. The framework of Circular-3 was discussed among JET and C/P. JET and C/Ps prepared the draft Circular and a Technical Mannual based on the framework for developing inventories of wastewater discharge sources. Necessary documents were described when necessary for each article on the draft Circular for explaining to the expert committee and the relevant

authority to obtain agreement. Through several TF meetings and other meetings/workshops, the draft circular was intensively discussed among VEA, Provincial DONREs, National Experts and the JET.



Source; JET

Figure 4-11 Framework of Circular-3

4.6.2 Discussion Points

(1) Type and Size of Pollution Sources to be Targeted

The type of target pollution sources for Circular-3 is point-sources controlled by MONRE/DONRE. Besides, the wastewater treatment facilities collecting and treating of wastewater from non-point sources generally, such as treatment facilities of domestic wastewater, livestock wastewater, and craft villages were also selected as the target for development of WDSI.

Lower limit of discharged wastewater volume for selecting target pollution sources for development of WDSI were discussed intensively.

Based on the discussion results, subcontract surveys for development of WDSI were implemented both Cau river basin and Dong Nai river basin through PPs activities. Example of categorization of target facilities by the subcontract survey are shown in Table 4-10.

Table 4-10 Example of Categorization of Target Facilities for Subcontract Survey for Development of WDSI

Category	A. Highest Priority (Questionnaire Survey& Water Analysis) Cau river: 100 facilities	B. Higher Priority (Questionnaire Survey) Cau river: 100 facilities	C. Others (No WDSI survey during the Project)
1. Factory (include Industrial Zone wastewater treatment facilities, and domestic wastewater treatment facilities)	a) Large scale (e.g. discharging more than 100m3/day wastewater) of factories belonging to the following sector - Basic metal manufacturer - Fabricated metal manufacturer - Machinery and equipment manufacturer - Food products and beverage manufacturer - Paper manufacturer - Textile manufacturer - Tanning enterprise - Industrial Zone wastewater treatment facilities	Medium scale (e.g. discharging 10~100m3/day wastewater) of factories belonging to the sectors shown left. Large factories (e.g. discharging more than 100m3/day wastewater) belonging to other sectors than ones shown left.	Other factories
2. Mining area	Mining areas along Cau river	Mining areas along tributary of Cau river	Other mining areas.
3. Craft village	Craft villages along Cau river	Craft villages along tributary of Cau river	Other craft villages.
4. Livestock facility	Facilities targeted by Decision No. 64/2003/QD-TTgand Decision No. 1788/2013/QD-TTg, or related other Decision issued by Province	Stockbreeding facilities along Cau river	Other livestock facilities.
5. Hospital	Facilities targeted by Decision No. 64/2003/QD-TTg and Decision No. 1788/2013/QD-TTg, or related other Decision issued by Province	Community hospitals along Cau river	Other hospitals.
6. Solid Waste Disposal Site	Facilities targeted by Decision No. 64/2003/QD-TTg and Decision No. 1788/2013/QD-TTg, or related other Decision issued by Province	Solid waste disposal site along Cau river	Other solid waste disposal sites.

Source: JET

Finally, WENID decided internally as responsible organization and made following criteria for the draft Circular. The wastewater sources inventory would be conducted at 4 levels:

a) Level 1: Wastewater sources equal to or more than 200 m3/day.
b) Level 2: Wastewater sources equal to or more than 50 m3/day.
c) Level 3: Wastewater sources equal to or more than 20 m3/day.
d) Level 4: Wastewater sources from the establishments which must have permits for discharge of wastewater into water sources according to the provisions of the Law on water resources.

In addition, list of the establishment types under the inventory of wastewater sources is attached as Appendix 1 of the draft circular.

Table 4-11 List of the Establishment Types (Appendix 1 of the Draft Circular-3)

1) Centralized urban sewage treatment facility	8) Natural rubber processing establishment
2) Wastewater treatment facility in industrial park	9) Steel production establishment
3) Petrol storage or station	10) Mining area
4) Textile-dyeing establishment	11) Trade village
5) Paper and paper pulp production establishment	12) Livestock farm
6) Ethanol production establishment	13) Medical center
7) Aquatic products processing establishment	14) Solid waste disposal site

Source: the final version of the draft circular, distributed at 5thh JCC meeting on 10 May 2018

(2) Target Parameters

Target parameters for WDSI were discussed continuously. Main idea to select target parameters were shown below.

a) Basic water quality parameters (pH, EC, etc.)

b) Index of organic pollution (BOD and COD)

c) Nitrogen and phosphorous compounds having standard values by TCVN/QCVN

d) Heavy metals having standard values by TCVN/QCVN

Finally, WENID decided internally as responsible organization and made the following table in the draft Circular:

Table 4-12 List of Target Parameters for WDSI (Appendix 1 of the Draft Circular)

No.	Parameter	Unit	No.	Parameter	Unit
1	T	°C	23	Sulfate (by H_2S)	mg/l
2	Color	Pt/Co	24	Florine	mg/l
3	pH		25	Ammonium (by N)	mg/l
4	BOD_5 (20°C)	mg/l	26	Nitrate (by N)	mg/l
5	COD	mg/l	27	Total nitrogen	mg/l
6	TSS	mg/l	28	Phosphate (by P)	
7	TDS	mg/l	29	Total phosphorous (by P)	mg/l
8	Arsenic	mg/l	30	Chlorine	mg/l
9	Mercury	mg/l	31	Residual Chlorine	mg/l
10	Lead	mg/l	32	Total organic chlorine plant protection chemicals	mg/l
11	Cadimi	mg/l	33	Total organic phosphorous plant protection chemicals	mg/l
12	Cr(VI)	mg/l	34	Total PCB	mg/l
13	Cr(III)	mg/l	35	Coliform	MPN or CFU/100ml
14	Copper	mg/l	36	Salmonella	Microorganisms/100ml

No.	Parameter	Unit	No.	Parameter	Unit
15	Zinc	mg/l	37	Shigella	Microorganisms /100ml
16	Nickel	mg/l	38	Vibrio cholera	Microorganisms /100ml
17	Manganese	mg/l	39	Total α active radioactivity	Bq/l
18	Iron	mg/l	40	Total β active radioactivity	Bq/l
19	Total cyanide	mg/l	41	Total surface active substances	mg/l
20	Total phenol	mg/l	42	Easy Absorbed Organic Halogen (AOX)	mg/l
21	Total oil/grease	mg/l	43	Dioxin	pgTEQ/l
22	Animal/plant oil/grease	mg/l			

Source: the final version of the draft circular, distributed at 5thh JCC meeting on 10 May 2018

4.6.3 Preparation of Technical Manual on WDSI Development for River Basin Management

(1) Background and Utilizing the Manual

The Technical Manual on WDSI Development for River Basin Management was prepared through the courses of training. Several Basic Trainings and Advanced trainings to develop WDSI were organized to use the PPs results. There were many important opinions/feed-backs from DONREs and VEA. Therefore, the Manual had been updating to reflect these opinions/feed-backs including sustainable development of WDSI. The final version of the manual is attached as Attachment 10 of this report.

(2) Contents of the Technical Manual

The Technical Manual on WDSI Development for River Basin Management consists of 3 parts as follows:

Part A. Objectives and Components of the Manual

Part B. Definition and Function of River Basin WDSI

Part C. Development of River Basin WDSI

Part A and Part B were mainly used for BTC-1-2. Training contents and results are described in section 5.2 of this report. And also, the part C was used for ATC-1-3 as described in section 4.3 of this report. Part C has an introduction box of example of WDSI survey in Cau and Dong Nai river basin. Followings are several main points of lessons from the PPs.

i) Information Collection

- ❑ Through the survey, non-cooperative targets were found. To implement the survey smoothly, a legal-base requirement on inventory survey should be clarified to target facilities.
- ❑ The most target facilities did not provide wastewater quality monitoring data. Additionally, the craft villages did not have the information on amount of water usage. To collect required information, both direct and indirect measures should be adopted at the same time, such as use of existing reports, and indirect information collection.
- ❑ There were several concepts/definitions of “wastewater discharge source”. Therefore, it was necessary to have common concept. Example is introduced in the Manual.
- ❑ There was lack of information of wastewater flow and substances.

- Some facilities refused to provide their information because they think the data is sensitive information for operation.

ii) Sampling and Analysis

- There was lack of outlet location information. Some facilities was being discharged through some outlets. Therefore, it was necessary to have wastewater discharge source inventory and need to accumulate data.

4.6.4 Supporting to implement Decision No.140 including Developing Decision for Implementation Plan

The Prime Minister of Vietnam approved the project "Surveying, evaluating, classifying and Developing of Database on Waste Source" as Decision No.140/2018/QD-TTg. This project is being implemented in 3 years (2018 - 2021) with the objective of investigating, evaluating and classifying sources of waste from production and service establishments which generate waste nationwide; On that basis, to build a database on sources of waste, which must be synchronous, unified and integrated with the national database on environment, satisfy the requirements of providing and sharing information fully, Accurately, promptly and effectively serve the state management of environmental protection. This project is not only for water, but also emission and waste. C/Ps and the JET used the term “Waste Inventory” for this project output and “Wastewater Inventory” which the Project already developed as PPs.

WENID was responsible agency to implement this project but VEA was re-structured in May 2018. After that, General Office of VEA took the responsibility to implement this project. JET had several discussions with this team when they were preparing an implementation plan of this project. In January 2019, JET confirmed that the implementation plan including questionnaires had referred the WDSI Technical Manual which was prepared by the Project. MONRE Minister Dr. Tran Hong Ha requested VEA combine this inventory system into MONRE environment database system and using online questionnaire for collecting data. Therefore, General Office of VEA are working for updating this implementation plan based on the comments from the Minister.

4.7 Activity 1-7: Prepare the Final Draft Guideline of Data and Information Sharing for Loading Capacity Calculation and Wastewater Discharge Sources Inventory Development

4.7.1 Framework of Circular-4

The framework of Circular-4 was discussed among JET and C/P. JET and C/P agreed to prepare the Circular at initial stage of the Project. And, the JET and C/P agreed to develop the Guidelines as final output.

(1) Objectives and Contents of the Guidelines

i) Objectives

The Project was preparing circulars named “Circular on Regulating the Assessment of River Loading Capacity and Wastewater Pollution Load Allocation Calculation (Circular-2)”, and” Circular on Regulating WDSI (Circular-3)”. The Guidelines aimed to provide guidance with basic principle of data and information sharing for above two circulars, loading capacity calculation and discharge quota, and wastewater discharge sources inventory development as important action for river basin management.

ii) Contents

The main contents of the guidelines are;

a) To identify required data and information to be collected for conducting activities concerning river basin management,

b) To provide technical guidance related to the process of data and information collection. such as expected sources of information and data collection format,

c) To identify items to be remarked for sharing data and information, and outcomes related to river basin management mentioned above, and

d) To identify responsibility of relevant organizations for data and information collecting and sharing concerning activities mentioned above.

(2) Expected User of the Guidelines

Expected users of the guidelines are described below.

i) RBOs and Vietnamese Environment Administration/Ministry of Natural Resource and Environment (MONRE/VEA)

The guidelines assist RBOs and VEA:

- To understand required data and information to be collected for conducting activities concerning river basin management.
- To check the process of data and information collection.
- To know the items to be remarked for sharing data and information.
- To clarify responsibility of relevant organizations for data and information collecting and sharing concerning activities mentioned above.

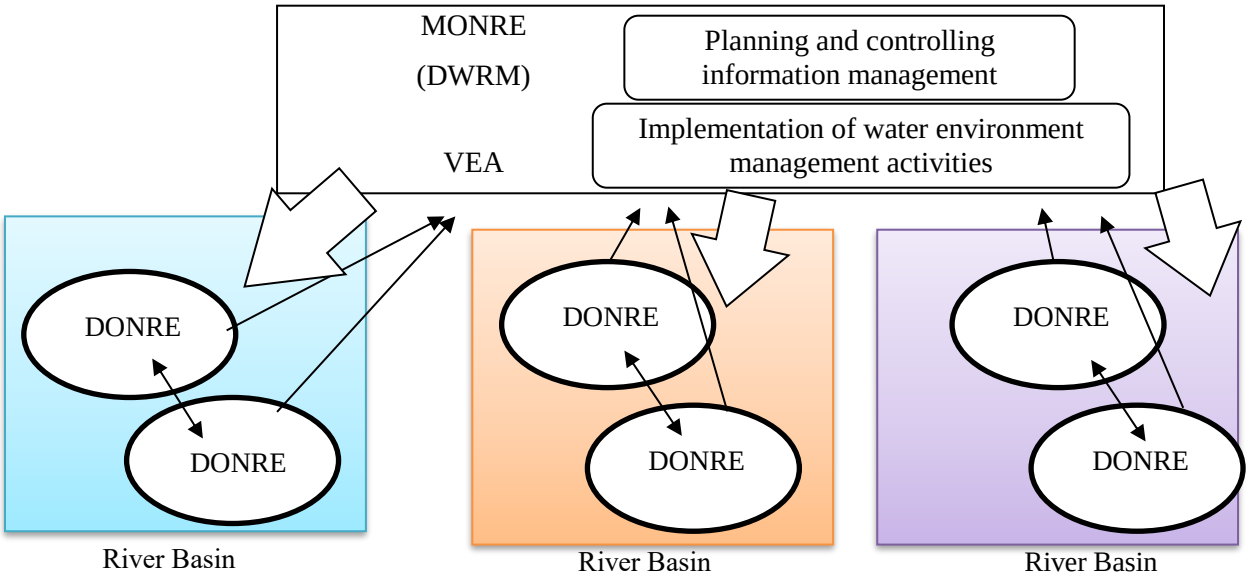
ii) Departments of Natural Resources and Environment (DONREs)

The guidelines assist DONREs:

- To understand required data and information to be shared for conducting activities concerning river basin management.
- To check the process of data and information sharing.
- To know the items to be remarked for sharing data and information.

iii) Basic Idea of Information sharing

The basic idea of information sharing is shown in Figure 4-12. Necessary information for river basin management can be gathered to MONRE/VEA and/or RBOs from each DONER separately. After that, related information of river basin can be shared to related DONREs.



Source; JET

Figure 4-12 Sharing of River Basin Water Environmental Information

4.7.2 Discussion Results among Relevant Departments especially with CEID

The JET and Vietnamese side had many discussions how to develop the Guidelines. Especially, CEID, Center for Environmental Information and Data, is one of important and relevant organization for the Guidelines. CEID requested JET to include the contents of Circular No.19/2016/TT-BTNMT on Environmental Protection Report. Through several updating of the Guidelines, JET reflect related parts of Circular No.19/2016/TT-BTNMT, The Guidelines is only to support loading capacity assessment and WDSI for RBM. CEID officer confirmed to reflect enough to the Guidelines.

4.8 Activity 1-8: Prepare the Final Draft Circular including Regulations on Guiding Format and Procedure of Requesting Environmental Compensation

4.8.1 Principle of the Circular

LEP 2014 affirms the legal basis for claiming compensation liability for damages caused by the acts causing environmental pollution and degradation in Clause 8 of Article 4. Besides positive achievements, there are some limitations, shortcomings in settlement of damage compensation since the current laws on damage compensation in this field only provide general principles that are difficult to be applied in reality. Regarding compensation for damages to the natural environment, there is only one legal document that is Decree No.03/2015/ND-CP; however, this document has not been detailed resulting in the fact natural environmental damages occur in almost provinces and cities of the country but are only subject to administrative sanctions other than damage compensation.

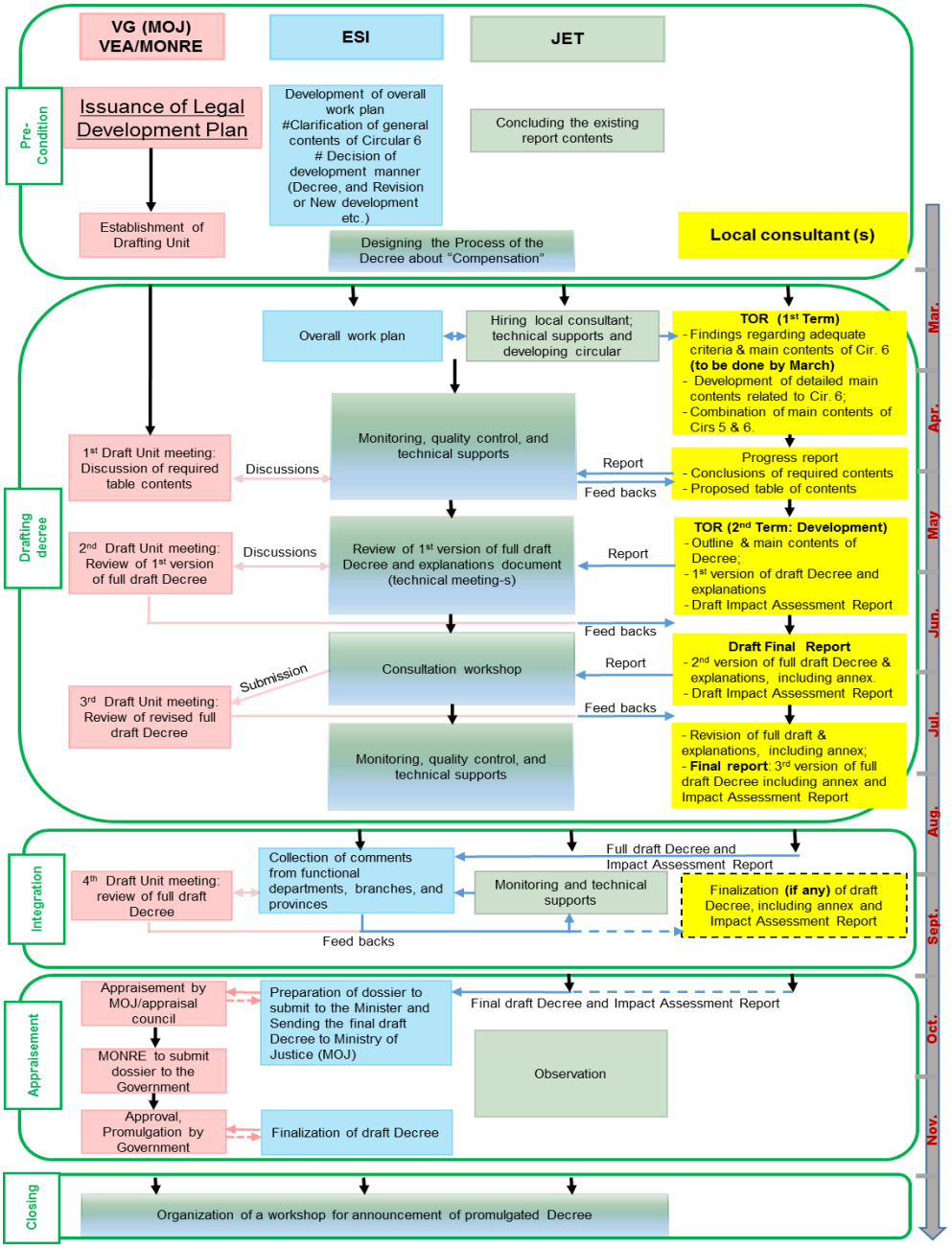
To enforce this Decree in practice, MONRE needs to develop and promulgates the guiding documents. One is a circular on guiding procedure for implementation of compensation for environmental damages and the other one is a circular on stipulating selecting criteria and responsibilities of agency On the other hand, any detailed implementation manner is not guided. Based on this situation, the circular development activities were done in the project.

The content of this Circular must be suitable and united with other legal documents on environmental protection and relevant legal documents. Moreover, the Circular must provide specific guidance on procedures, process to implement compensation for environmental damages in accordance with Decree No. 03/2015/ND-CP and overcome difficulties, shortcomings from the practical settlement of claim for compensation for environmental damages in the recent year.

These Circular must ensure feasibility in implementation of compensation for environmental damage; meet the requirement of administrative procedure reform; and facilitate relevant individuals, organizations in claiming compensation for environmental damage.

4.8.2 Development Schedule

The expected schedule for development of Circular-5 and Circular-6 is shown in the figure below. Due to delay of revising work of LEP, legalizing process of Circular-5 and Circular-6 was not finished during the Project. As of June 2019, drafting the Circulars as a part of revised Decree has been finished. Appraisement and closing process are expected to be conducted by MONRE/VEA in post project phase.



Source; JET

Figure 4-13 Development Process of Decree (Combination of Circular-5 and -6)

This development process was confirmed by both sides. It is very important for the following reasons.

1) PMU can know which kinds of action and activities should be done.
2) The schedule management is easier.
3) The expected outcome of each activity can be discussed and confirmed.

At the present, due to the Vietnamese regulation, those circular contents should be developed as Decree not Circular.

4.8.3 Discussion Point

1) It is an essential need that the Circular or Decree on stipulating the process, procedure to implement compensation for environmental damage should be promulgated. Currently, localities are handling environmental disputes based on their experience due to the lack of a unified regulation on compensation for environmental damage.
2) It is very complicated if the actors causing environmental damage do not agree with the damage calculated by the compensation-requesting agency. As a result, national environmental assessment institutes should be formed.
3) The important issues to be focused in the near future are facilities, equipment and human resources with understanding and experience in data and evidence collection; therefore, it is necessary to equip modern facilities and machine as well as strengthen capacity of the service provider.
4) Regarding the comments about the draft Circular, we find that most comments and opinions are focused on the main content of the draft Circular, many of which are practical and originated from the reality. Generally, the counterparts agree with the draft Circular and confirm the necessity of the development of promulgation of the Circular. Moreover, some difficulties in implementation of the Circular were raised; some suggestions were that the research team should continue study and finalization of the draft Circular; some say that the draft Circular is not suitable with the current regulations. These comments shall be considered by the Circular Drafting Unit in order to ensure feasibility of the Circular when it is promulgated.

4.9 Activity 1-9: Prepare the Final Draft Circular Including Regulations on Stipulating Selecting Criteria and Responsibilities of Agency Providing Environmental Monitoring and Assessment Service to Collect Evidences of Compensation and Environmental Damage; and Guiding the Setting up and Operation of Councils for Data and Proof Appraisal

4.9.1 Principle of the Circular

One of the difficulties is how to make accurate and adequate calculation of damages as well as identify the damage compensation responsibility. The state management agencies are not allowed to calculate the damages caused by their environmental pollution causing activities due to the limitation of the capacity; therefore, the laws empower them to select the other institutions, organizations, individuals that can help them to make calculation of damages. However, the selection of institutions, organizations, individuals capable of undertaking the monitoring and measurement serving data, evidence collection and determination of damages is not a simple task. Which selection criteria to be applied and how to select the service providers (the selection process and procedures) must be studied carefully, the selection for the most suitable service providers for calculation and determination of damages among various qualified and capable organizations is a civilized manner of competition in the market economy in order to select the organizations and/or individuals that can meet the technical and economic requirements. The birth and existence of bidding aim at ensuring the competitiveness, equality, transparency in selection of the most suitable bidders and the economic efficiency of a package.

Bidding activities take a role in ensuring four criteria including Effectiveness – Competitiveness - Equality – Transparency. Effectiveness is obtained possibly in term of finance, time or any other criteria depending on the purposes of the activities.

4.9.2 Difficulties and Challenging Issues

Through the activities of this development circular, the following issues are pointed out as challenging issues.

i) The limitation of the service agency

Basic information of the service agency (SA) (consultant, institution and university etc.) is collected. And we found that there are a lot of the SA. On the other hand, the scale is mainly small and medium and general consultant is limited. For identifying any cause of a violation and computing amount of this one is needed to have high experts and capacity. The government side should have much information of the SA for smoothly doing bidding process.

ii) Evaluation process

In Vietnam, the certificate system is already developed but this certification and evaluation process are still limited. For example, the analysis work can be covered by this system, but other works (computing, negotiation and identification of violation case) are not included. Through this bidding process trial should be improved more and more.)

iii) The estimation of cost

In Vietnam, there is no specific guideline for assessment of an implementation cost (including unit-cost) for collecting evidence of compensation and environmental damage. It means that it is difficult to assess an amount of any consultant activity. Therefore, it is better to prepare unit cost list for the officers to evaluate whether consultant fee for collecting evidence of compensation and environmental damage is reasonable or not.

4.9.3 Final Draft Circular

At the present, due to the Vietnamese regulations that Circular can just stipulate technical regulations and cannot designate any instruction related to policy, these Circulars' contents should be developed as Decree not Circular. So, the prepared Final draft Circular on guiding format and procedure of requesting environmental compensation, and on selecting criteria and responsibility of agency collecting evidence of compensation and environmental damage were compiled as a part of a draft Decree enforcing after finishing revision of LEP.

4.10 Activity 1-10: Guide and Share the Outputs Developed with Concerned Departments in MONRE/VEA and DONREs in the Target River Basins

Outputs were prepared as legislative document such as Circular, guideline, etc. as showing in Table 4-13. These documents were explained and shared to key organization through workshop and TF meetings.

Table 4-13 Products on Output-1 Activities

No.	Product Name	Legislation	Style
1	Regulating assessment of wastewater receiving capacity and loading capacity of rivers and lakes	Circular	Document, 12 pages
2	Promulgating the technical guideline for calculating of loading capacity of river water sources	VEA Decision	Document, 45 pages
3	Guideline on Wastewater Discharge Source Inventory (WDSI) development for river basin water environment management	-	Document, 69 pages

No.	Product Name	Legislation	Style
4	Guidelines of Data and Information Sharing for Loading Capacity Calculation, and Wastewater Discharge Sources Inventory Development	-	Document, 8 pages
5	Guideline for Coordination Mechanism in Pollutant Load Discharge Management	-	Document, 6 pages
6	Environmental compensation report	Draft Circular	Document
		Draft Degree	Document
7	Review works for Environmental Compensation		5 Report

Source; JET

5. Output-2: Enforcement Capacity on RBWEM of MONRE/VEA and Target DONREs is Strengthened through Implementation of Pilot Projects (PPs)

Output 2 focused on clarification of technical issues related to final draft Circulars and relevant legislative documents by implementing of PPs, and providing technical training for pollution load analysis and loading capacity assessment for conducing RBWEM by total pollution load control approach.

5.1 Activity 2-1: Prepare Capacity Development (CD) Plan Based on Actual CD Needs and Results of Capacity Assessment (CA)

In order to carry out effective CD for MONRE/VEA and target DONREs, JET prepared CD plan based on the results of the first capacity assessment.

Initial relevant capacities related to RBWEM was confirmed by distributed questionnaires on the capacity assessment, described in Attachment 6.

When the CD plan was prepared, the following factors was considered:

- Consistency of CD plan with PDM and PO
- Relationship with expected outcomes of PPs and its obtained timing
- Planned training schemes under the Project, such as discussion meeting, OJT, training in Japan, and study tour

The prepared CD plan was summarized in the Section 3.4.4. As described in the Section, the plan was prepared by each important component concerning RBWEM, those are coordination mechanism, loading capacity assessment, WDSI, data and information sharing, and environmental compensation, and the training course was divided into BTC and ATC, depending on the level of skills and knowledge provided through the training.

5.2 Activity 2-2: Prepare a Program of Training Courses and Conduct Training

The training program on Output-2 is focused on obtaining basic knowledge regarding ambient water quality, pollution load discharge etc. and principal of WQ model. The training courses are called to Basic Training Corse (BTC).

5.2.1 Prepare a Program of Training Courses

The RBWEM requires sufficient technical and management skills and knowledge. In addition, as for PPs implementation, it was required to have basic knowledge related to the final draft circulars prepared through the Project. Therefore, JET planned for basic training course for providing those knowlege. This training course is divided into 4 sessions as shown in Table 5-1 due to difference of target aspects. Main objectives of this training course are to brush up individual technical skills and knowledge of C/Ps, and set up to move advance training course to be provided by JET. A part of training materials were used for a part of technical guidelines and technical manual of Circular-2 and 3, respectively.

For developing training program of ATC, as for first step, the PPs of the Project has generated some outputs such as WDSI with pollution source maps and discharged pollution load results for the pilot area of both river basins. As next step, JET expects calculated that tentative loading capacity at the control point of the pilot area, and tentative discharge quota allocated logically in provincial level. With using the outputs mentioned above, ATC was planned and conducted.

ATC-1 are structured the 2 major contents as named on the ATC-1-2 and ATC-1-3. ATC-1-2 was to train pollution load analysis and loading capacity assessment. ATC-1-3 was to train development of WDSI. Both trainings were conducted as hands-on training, based on the request from each target province. Training program of ATC under Output-2 is shown in Table 5-1The expected outcome by these training program and implement schedule are shown in Table 5-1.

Table 5-1 Training Program for BTC and ATC under Output-2

Training	Purpose and Contents	Duration
Basic Training Course (BTC)		
BTC 1-2	Planning and implementation of WDSI, classification and categorization of pollution sources including criteria, and pollution load analysis at pollution sources	Aug 2016 - Jun 2017
BTC 1-3	Development and operation of simulation model of QUAL-2K in Cau river and MIKE-11 in Dong Nai river, pollution load analysis, and estimation of WQ by using simulation model	Aug 2016 - May 2017
BTC 1-4	Planning and implementation of pollution source control	Aug 2016 - Mar 2017
Advanced Training Course (ATC)		
ATC-1-2	Hands-on training on pollution load analysis and loading capacity assessment	Jun 2017 - Sep 2017
ATC-1-3	Hands-on training on WDSI Development	May 2017 – Jun 2017

Source: JET

5.2.2 Conduct of Training Courses

(1) Implementation Results of BTC 1-2, TC on Planning and Implementation of WDSI, Classification and Categorization of Pollution Sources including Criteria, Pollution Load Analysis, and Estimation of Water quality by Using Simulation Model

The training purpose of BTC 1-2 are as follows:

1) To provide knowledge that can be used for operation a new circular to be prepared by the Project, named the circular on main wastewater sources for RBWEM (Circular-3).

2) To provide trial experiences of the expected tasks by DONRE under the Circular-3 in future.

The training contents is shown in Table 5-2. The number of participants in each organization and main questions and comments are shown in Table 5-3. Through the training, the trainees obtained the following knowledge.

- Information collection method about pollution sources in Japan
- Management method for point pollution sources include small and medium scale factories
- How to adapt appropriate industrial classification code in each province
- How to update WDSI and pollution source map

Table 5-2 Plan of BTC-1-2

No.	Training Title	Participated Organization	Related circular	Duration
BTC 1-2: TC on planning and implementation of wastewater discharge source inventory (WDSI)				
1st Training	Lecture on role of WDSI for RBWEM with WDSI development and upgrading process Report on progress of WDSI development work sub-contracted by the Project	- EPA - Center concerning environmental monitoring - Center concerning information technology	Articles concerning WDSI development, maintenance upgrading and usage for RBWEM in Circular-3	September, 2016
2nd Training	Introduction of developed WDSI Practical Training for Pollution Source Map usage to use QGIS(development & Utilization)			Mar., 2017 (Jun., 2017)
3rd Training	OJT on analysis of collected main pollution sources by WDSI Lecture on use of WDSI for RBWEM			Jun., 2017

Source: JET

Table 5-3 Implementation Results of BTC-1-2

No.	Results	VEA	Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
1st Training	Number of participants	22	19	9	12	7	20	20	19
	Training date	23 Sep 2016	20 Sep 2016	21 Sep 2016	22 Sep 2016	14 Sep 2016	12 Sep 2016	19 Sep 2016	15 Sep 2016
	Main content learned	- Defining river basin areas which are under targeted pilot project areas, target area and target district. - Information collection method about pollution sources in Japan. - Management method for point pollution sources include small and medium scale factories. - Information sources to be inventoried in WDSI. - Adapting appropriate industrial classification code in each province. - Target facilities for the circular which is developed through the project activities.							
2nd Training	Number of participants	4	9	11	5	6	2	8	6
	Training date	22 Jun 2017	1 Mar 2017	2 Mar 2017	3 Mar 2017	7 Jun 2017	8 Jun 2017	6 Jun 2017	9 Jun 2017
	Main content learned	- Grasping point pollution source information in river basin is essential for river basin management. - How to update WDSI and pollution source map (QGIS). - Definition of environmental license (EIA, post-EIA). - Existing issues on WDSI usage that many regulations are existing but not implanting appropriately.							

Source: JET

(2) Implementation Results of BTC 1-3, TC on Development and Operation of Simulation Model of QUAL-2K in Cau river and MIKE-11 in Dong Nai River

Target of the training is to strengthen the basic knowledge of DONRE to grasp current environmental status of the river and to assess future water quality in the river. The training contents is shown in At the end of training, trainees requested to conduct hands-on training for operation of simulation model with using real data in pilot project areas instead of assumption data for obtaining practical exercises. This opinion was considered and reflected to the ATC training program.

Table 5-4. The number of participants in each organization and main questions and comments are shown in Table 5-5. Through the training, the trainees obtained the following knowledge.

- Essential background theory and practical tools (QGIS-QSWAT) for watershed delineation
- Basic knowledge of run-off analysis
- Basic knowledge on simulation model operation
- Providing reasons/reference sources for setting values of model parameters/coefficients, and Pollution load units (PLU), especially how to set these values based on natural conditions of each province
- Theory of pollution load calculation, and model simulation, as well as procedure to conduct above contents
- Basic knowledge on estimation of loading capacity

At the end of training, trainees requested to conduct hands-on training for operation of simulation model with using real data in pilot project areas instead of assumption data for obtaining practical exercises. This opinion was considered and reflected to the ATC training program.

Table 5-4 Plan of BTC-1-3

No.	Training Title	Concerned division	Related circular	Duration
1st Training	Training on rainfall-runoff analysis	Basic practical level regarding hydrology for water quality analysis	Circular-2	September, 2016
	GIS training and delineation of sub river basin			September, 2016
2nd Training	Training on Developing water flow model (Simple QUAL2K modeling)			November, 2016
	Training on Developing water flow model (MIKE modeling)			November, 2016

Source: JET

Table 5-5 Implementation Results of BTC 1-3

No.	Results	VEA	Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
1st Training	Number of participants and Training date	12	19	18	22	15	20	14	19
		15 Nov 2016	5 Sep 2016	2016/8/31	6 Sep 2016	13 to 14 Sep 2016	12 Sep 2016	14 Sep 2016	15 Sep 2016
	Main contents learned	- Essential background theory and practical tools (QGIS-QSWAT) for watershed delineation. - Basic knowledge of run-off analysis							
2nd Training	Number of participants and Training date	9	17	10	15	17	11	26	8
		1 Dec 2016	14 Nov 2016	16 Nov 2016	17 Nov 2016	22 to 23 Nov 2016	29 Nov 2016	24 to 25 Nov 2016	30 Nov 2016
	Main contents learned	- Basic knowledge on simulation model operation - Providing reasons/reference sources for setting values of model parameters/coefficients, and Pollution load units (PLU), especially how to set these values based on natural conditions of each province - Theory of pollution load calculation, and model simulation, as well as procedure to conduct above contents - Basic knowledge on estimation of loading capacity							

Source: JET

(3) Implementation Results of BTC 1-4, TC on Planning and Implementation of Pollution Source Control

The training purpose of BTC 1-4 are as follows:

1) To provide knowledge that can be used for operation a new circular to be prepared by the Project, named the circular on main wastewater sources for RBWEM (Circular-3).

2) To provide trial experiences of the expected tasks by DONRE under the Circular-3 in future.

The training contents is shown in Table 5-6. The number of participants in each organization and main questions and comments are shown in Table 5-7. Through the training, the trainees obtained the following knowledge.

- How to handle the samples showing two different analytical results
  Example of Japanese inspection method.
- Inspection activities and pollution source information management
- Example of wastewater treatment method such as treatment by Johkasou

Table 5-6 Plan of BTC 1-4

No.	Training title	Concerned division	Related circular	Duration
BTC 1-4: TC on planning and implementation of pollution control				
1st Training	Lecture on expected roles and required actions by environmental check and inspection for RBWEM	- Administrative sections comprising of environmental check team - Inspection Department	Circular-2 Circular-3	September, 2016
2nd Training	Lecture on Planning and implementation of pollution source control			Nov. to Dec., 2016

Source: JET

Table 5-7 Implementation Results of BTC 1-4

No.	Results	VEA	Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
1st Training	Number of participants	22	19	9	12	7	20	20	19
	Training date	23 Sep 2016	23 Sep 2016	21 Sep 2016	22 Sep 2016	14 Sep 2016	12 Sep 2016	19 Sep 2016	15 Sep 2016
	Main contents learned	- How to handle the samples showing two different analytical results --> In the field of inspection, inspection team takes surplus amount of water sample, and keeps for as needed re-analyzing. Sometime, inspection team and business entities take sample again by both parties, analyze by both parties, and conduct cross-check. - Example of Japanese inspection method. - Inspection activities and pollution source information management							
2nd Training	Number of participants	9	15	6	9	4	7	10	8
	Training date	15 Nov 2016	25 Nov 2016	28 Nov 2016	29 Nov 2016	21 Nov 2016	22 Nov 2016	22 Nov 2016	23 Nov 2016
	Main contents learned	- Example of wastewater treatment method Possibility to treat oil and shampoo etc. in Johkasou --> It's possible to treat a few volumes of oil and other substance. Possibility to remove heavy metal in wastewater treatment plant --> It's not possible. Fundamentally, hazardous substance including heavy metal should be restricted in accordance with restricted in related law and regulation, and removed and decreased before discharging into sewerage facilities. Structure, treatment process and cost of Johkasou. What sort of measures is required if untreated wastewater is discharged into water bodies? --> It should be checked an industrial wastewater at first.							

Source: JET

(4) Implementation Result of ATC-1-2 on Hands-on-Training on Pollution Load Analysis

ATC-1-2 was focused on practical learning for understanding of technical process concerning Circular-2 for pollution load analysis with simulation model and techniques for calculation method of loading capacity and science-based discharge quota.

The training contents is shown in Table 5-8. The number of participants in each organization and main questions and comments are shown in Table 5-9. Through the ATC-1-2, trainees obtained skills and knowledge on pollution load analysis and loading capacity assessment. As described in the section 3.4.6, the trainees recognized their knowledges on how to implement and summarize the result for pollution load analysis and water quality simulation were enhanced by ATC-1-2. After the training, Thai Nguyen DONRE, bac Ninh DONRE, Binh Duong DONRE and Dong Nai DONRE has started their trial work on pollution load analysis and loading capacity assessment in each province. Based on the results, JET considered that the ATC provided skills and knowledge for pollution load analysis and loading capacity assessment.

Table 5-8 Plan of ATC 1-2

No.	Training title	Concerned division	Related circular	Duration
ATC 1-2: Hands-on training on pollution load analysis				
1st Training	Understanding of watershed mechanism - Pollution load analysis and water quality model (QUAL-2K and MINKE 11) of the PPs watershed -	- Select the proper staffs on practical level regarding water quality analysis	Circular-2	June 2017
2nd Training	Assessment of watershed - Loading capacity and scientific allocation -			July to August 2017
Training in Japan	Watershed Management based on Japanese experiences			
3rd Training	Loading capacity at control point in river basin and tentative allocation of discharge quota in each province			September 2017

Source: JET

Table 5-9 Impementation Results of ATC 1-2

No.	Results	VEA	Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
1st Training	Number of participants	5	20	22	15	18	3	18	15
	Training period	May-June 2017							
2nd Training	Number of participants and	19	11	15	10	9	7	11	14
	Training period	July-Aug 2017							
Training in Japan	Number of participants	3	1	1	1	1	1	1	1
	Training period	12th July, 2017							
3rd Training	Number of participants	4	6	8	6	3	4	8	4
	Training period	Sep 2017							
Results	Main contents learned	ATC-1-2 conducted based on the comment that longer training time should be allocated to make trainees understand water quality model simulation. All training included two sessions. The first session presented methodology and theory of pollution load analysis, simulation models, and loading capacity. In the second session, practical exercises provided as 2-4 days training, so that trainees understood the theory, and apply it into practice better.							
	Comment	1. Details of each calculation step should be written in training materials. 2. For the exercises using Excel, QGIS, or MIKE-11 model, the instructors should record the screen and share to trainees, in order for them to watch the video recording, and learn later as necessary. 3. The PLUs, model coefficients, values appropriate for each province should be presented. Otherwise, the assumption and condition for application of those values should be presented. 4. Input data should be updated.							
	Actions by JET during the training series on pollution load analysis, Simulation models & Loading capacity calculation:	1. To address the comment No.1 and No.2, JET with national experts prepared the Technical Guideline of Circular-2 on assessment of loading capacity, and many PPT materials for each training session, JET and National experts, and 8 Text Books were developed. Training materials were compiled and published as VEA published book at the end of the Project. 3. To address the comment No.3, JET organized totally 2 technical meetings and 1 consultation workshops with Vietnamese experts, and it was agreed that the PLU coefficients from international experiences could be used in the context of lacking local data.							

Source: JET

(5) Implementation Results of ATC 1-3, Lecture and Hands-on-training for Wastewater Discharge Source Inventory (WDSI) Development

ATC 1-3 was conducted as hands-on training on WDSI development and analysis with lecture on way of using WDSI for wastewater discharge source control activity with provincial WDSI based on PPs outcome, and developing wastewater discharge source map. The number of participants from each organization is shown in Table 5-10. In the training, developed WDSI by PP was used for identifying prior wastewater discharge sources from total pollution load control viewpoint. The trainees experienced the way of WDSI usage, and it would contribute to wastewater discharge source control in post-project phase.

Table 5-10 Implementation of ATC 1-3

Results	VEA	Thai Nguyen	Bac Giang	Bac Ninh	Binh Duong	HCMC	Dong Nai	BRVT
Number of participants	3	24			6	2	9	6
Training date	22 May 2017	16 Jun 2017			7 Jun 2017	8 Jun 2017	6 Jun 2017	9 Jun 2017
Main contents learned	- How to apply WDSI for regular administrative pollution control activities such as usage for environmental check and inspection - How to update the WDSI by administrative organization - Type of wastewater discharge sources information to be updated							
Comment	- It was better to have completed manual as text book							
Actions by JET during the training series on WDSI development	- JET remarked that it is possible to select/prioritize wastewater discharge sources or potential point pollution sources by WDSI, and cost-effective pollution control activities can be implemented to use WDSI. - JET developed WDSI manual through the course of training including BTC and distributed to participants. So that update information and developing of WDSI can/shall be implemented by DONRE, continually.							

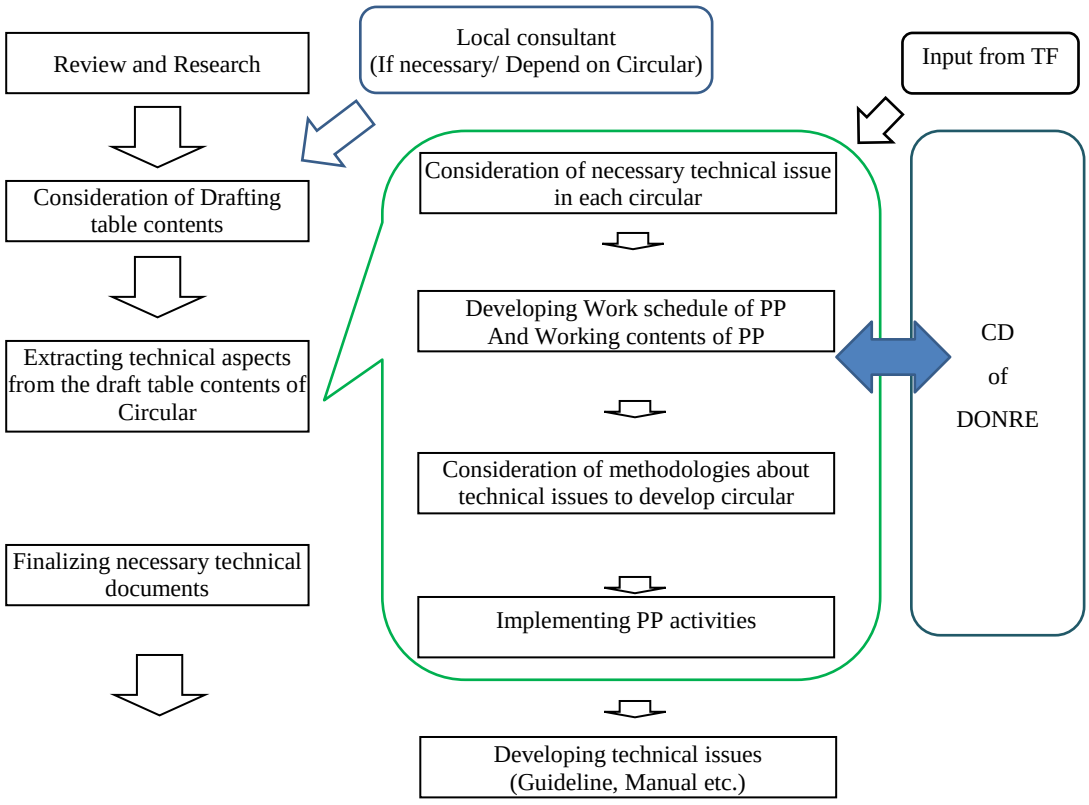
Source: JET

5.3 Activity 2-3: Develop the Pilot Projects (PPs) Implementation Plan in Cau River Basin and Dong Nai River Basin Clarifying Responsibility among MONRE/VEA, DONRE, and the JICA Expert Team (JET)

5.3.1 Purpose and Structure of Pilot Projects (PPs)

(1) Purpose of the PPs

In the Project, PPs were planned with the aim at i) clarifying assumed technical issues, ii) effectively developing useful circulars, and iii) preparing necessary training programs in both target river basins, Cau river basin and Dong Nai river basin, so as to obtain knowledge about inter-provincial issues. Several issues were assumed when the Project prepared final draft Circaular-2 on loading capacity assessment and final draft Circular-3 on WDSI development. The issues were not only institutional and organizational issues but also technical aspect such as difficulty of water quality model and database development due to insufficient available data and information. The PPs comprised of subcontract survey and various activities for calculation and examination of loading capacity based on the data and information obtained. The scope of PPs are shown in Figure 5-1.

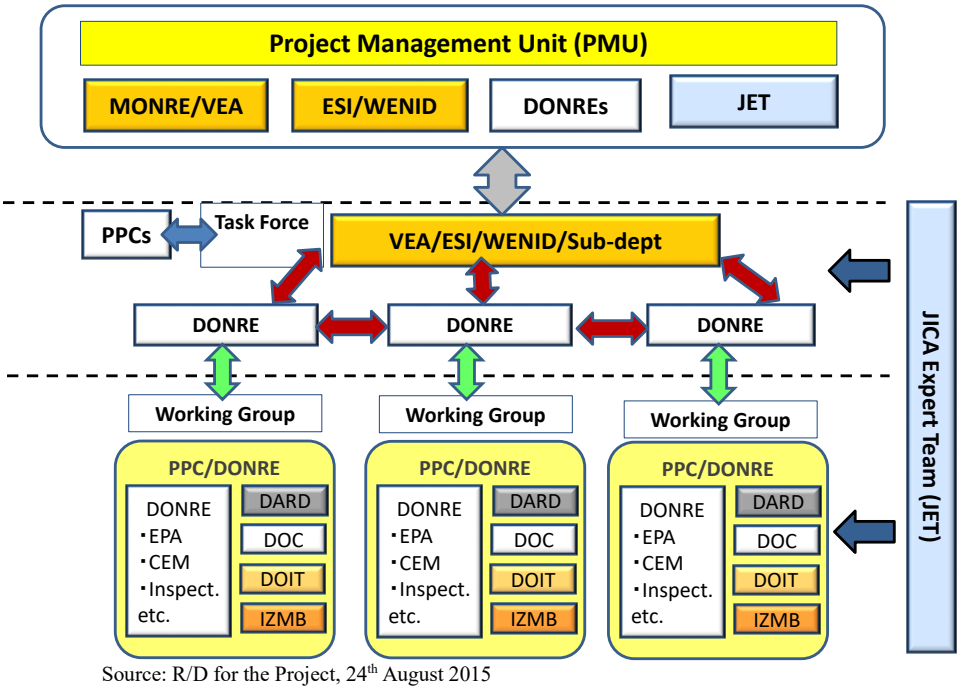


Source: JET

Figure 5-1 Scope of PPs activity

(2) Implementation Structure of the PPs

The implementation structure of the PPs are shown below as Figure 5-2.



Source: R/D for the Project, 24th August 2015

Figure 5-2 PPs Implementation Structure

5.3.2 PPs Implementation Plan in Cau River Basin

(1) Component of PPs in Cau River Basin

The PPs are planned as shown in Table 5-11 including the outcome of sub-contract works.

Table 5-11 PPs in Cau River Basin

No.	Items	Purpose	Methodology	Duration
Developing simulation model for calculating loading capacity and tentative discharge quota logically				
1	Pollution load analysis	To identify discharged pollution load by each province	Calculating discharged pollution load with collected socio-economic data and pollution load unit collected in Vietnam by the sub-contract work	October 2016 to March 2017
2	Construction of simulation model	To calculate loading capacity and allocate tentative discharge quota logically	Develop simulation model with "QUAL-2K" by the sub-contract work	October 2016 to March 2017
3	Calculation of loading capacity	To show loading capacity at the control point on target year to VEA/DWRM and the concerned provinces.	Calculate loading capacity by the developed simulation model based on the result of pollution load analysis with run-off coefficient and self-purification coefficient selected by JET.	April to May 2017
4	Allocation of tentative discharge quota logically	To provide basic information for examination of discharge quota among VEA/DWRM and the concerned provinces.	Calculate tentative discharge quota by the developed simulation model.	May to June 2017
5	Trial examination on effectiveness of possible measures for reducing pollution load considering allocated discharge quota	To experience on water environmental management using loading capacity and discharge quota	Provide training on water environmental management using loading capacity and discharge quota	July to October 2017
Developing and Operation of WDSI				
1	Developing WDSI	To list main pollution sources with their discharged pollution load amount	Collect pollution source information and store collected information as Excel database by the sub-contract work	September 2016 to February 2017
2	Developing pollution source map	To provide visible information of main pollution sources with their discharged pollution load amount	Prepare digital maps by QGIS with calculating discharged pollution load by the sub-contract work	September 2016 to February 2017
3	Operating the developed WDSI by the concerned provinces	To examine the way of usage, update and upgrade of the developed WDSI	Provide training on the way of usage, update and upgrade of the developed WDSI considering current condition of each concerned province	May to October 2017

Source: JET

(2) Implementation schedule of PPs in Cau River Basin

The implementation schedule of PPs is shown in Table 5-12.

Table 5-12 Implementation Schedule of PPs in Cau River Basin

#	Items	2016				2017				2018			
		1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
1	Pollution load analysis												
2	Construction of simulation model												
3	Calculation of loading capacity												
4	Allocation of tentative discharge quota logically												
5	Trial examination on effectiveness of possible measures for reducing pollution load considering allocated discharge quota												
1	Developing WDSI												
2	Developing pollution source map												
3	Operating the developed WDSI by the concerned provinces												

Source: JET

5.3.3 PPs Implementation Plan in Dong Nai River Basin

(1) Component of PPs in Dong Nai River Basin

The PPs is planned as showing Table 5-13 including the outcome of sub-contract works.

Table 5-13 Component of PPs in Dong Nai River Basin

No.	Items	Purpose	Methodology	Duration
Developing simulation model for calculating loading capacity and tentative discharge quota logically				
1	Pollution load analysis	To identify discharged pollution load by each province	Calculating discharged pollution load with collected socio-economic data and pollution load unit collected in Vietnam by the sub-contract work	October 2016 to March 2017
2	Construction of simulation model	To calculate loading capacity and allocate tentative discharge quota logically	Develop simulation model with "MIKE 11" by the sub-contract work	October 2016 to March 2017
3	Calculation of loading capacity	To show loading capacity at the control point on target year to VEA/DWRM and the concerned provinces.	Calculate loading capacity by the developed simulation model based on the result of pollution load analysis with run-off coefficient and self-purification coefficient selected by JET.	April to May 2017
4	Allocation of tentative discharge quota logically	To provide basic information for examination of discharge quota among VEA/DWRM and the concerned provinces.	Calculate tentative discharge quota by the developed simulation model.	May to June 2017
5	Trial examination on effectiveness of possible measures for	To experience on water environmental management using loading capacity and	Provide training on water environmental management using loading capacity and	July to October 2017

No.	Items	Purpose	Methodology	Duration
	reducing pollution load considering allocated discharge quota	discharge quota	discharge quota	
Developing and Operation of WDSI				
1	Developing WDSI	To list main pollution sources with their discharged pollution load amount	Collect pollution source information and store collected information as Excel database by the sub-contract work	September 2016 to February 2017
2	Developing pollution source map	To provide visible information of main pollution sources with their discharged pollution load amount	Prepare digital maps by QGIS with calculating discharged pollution load by the sub-contract work	September 2016 to February 2017
3	Operating the developed WDSI by the concerned provinces	To examine the way of usage, update and upgrade of the developed WDSI	Provide training on the way of usage, update and upgrade of the developed WDSI considering current condition of each concerned province	May to October 2017

Source: JET

(2) Implementation schedule of PPs in Dong Nai River Basin

The implementation schedule of PPs is shown in Table 5-14.

Table 5-14 Implementation Schedule of PPs in Dong Nai River Basin

#	Items	2016				2017				2018				
		1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	
Developing simulation model for calculating loading capacity and tentative discharge quota logically														
1	Pollution load analysis			━	━	━								
2	Construction of simulation model			━	━	━								
3	Calculation of loading capacity						━							
4	Allocation of tentative discharge quota logically						━							
5	Trial examination on effectiveness of possible measures for reducing pollution load considering allocated discharge quota							━	━					
Developing and Operation of WDSI														
1	Developing WDSI			━	━	━								
2	Developing pollution source map			━	━	━								
3	Operating the developed WDSI by the concerned provinces						━	━						

Source: JET

5.3.4 PPs Implementation Plan for Public Awareness

(1) Objectives of PPs for Public Awareness Activities

As a one of activities of the PPs, an environmental awareness activity shall be implemented by C/Ps including target DONRE and JET. For proceeding river basin management, the cooperation of relevant stakeholders other than governmental administrative bodies is essential. Through the careful discussion between the Project Management Unit (PMU) and JET, it was recommended to implement the awareness activity in Bac Giang province aiming at promoting of Cau river basin protection and strengthening target DONRE's capacity for promoting awareness on the water environment in public sector. The objectives of the subcontract work are:

1) To conduct demonstration activity on river water sampling and field analysis together with Bac Giang DONRE for raising awareness on RBWEM.
2) To share the outcome of demonstration activity described above by information sharing using existing internet homepages operated by MONRE/VEA and/or Bac Giang DONREs.

(2) Component of PPs for public awareness

Major components of PPs are as follows:

a) To prepare Water Quality Test kits
b) To prepare demonstration goods (e.g. T-shirts, hat, etc..) for environmental awareness activities.
c) To implement environmental awareness events (total three (3) times).
d) To review the results of environmental awareness events and summarize lessons for feedback to future environmental awareness activity.
e) To develop materials for information sharing.
f) To develop web-material and to disseminate the activity results.

(3) Implementation schedule of PPs for Public Awareness

Implementation schedule of PPs is shown in Table 5-15.

Table 5-15 Implementation Schedule of PPs for Public Awareness

No	Works	2017								
	Month	Jul	Aug		Sep		Oct		Nov	
1	Bidding process for subcontractor	■								
2	a) To prepare Water Quality Test kits b) To prepare demonstration goods (e.g. T-shirts, hat, etc..) for environmental awareness activities		■	■						
3	c) To implement environmental awareness events (total three (3) times)			▲ 1st		▲ 2nd		▲ 3rd		
4	d) To review the results of environmental awareness events and summarize lessons for feedback to future environmental awareness activity			■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■		
5	e) To develop materials for information sharing						■	■	■	
6	f) To support the dissemination of the activity results							■	■	

Source: JET

5.4 Activity 2-4: Implement PPs in Cau River Basin and Dong Nai River Basin including Public Awareness

5.4.1 Implementation of PPss in Cau River Basin

JET has conducted and managed 4 sub-contract works related to simulation model and WDSI in Cau and Dong Nai river basins in line with PPs activities with cooperation of concerned DONREs. The summarized result is shown in Table 5-16. Major outcomes through PPs are shown to Figure 5-3 to Figure 5-6.

Table 5-16 Results of PPs in Cau River Basin

No.	Items	Results	Outcome/ Findings
Developing simulation model for calculating loading capacity and tentative discharge quota logically			
1	Pollution load analysis	The pollution load analysis has been conducted in the pilot areas in March 2017.	The obtained outcomes were upgraded by co-working through the Advanced Training Program.
2	Construction of simulation model	The simulation model for the Pilot Project area was developed in May 2017.	JET used the model for calculating loading capacity and science-based discharge quota.
3	Calculation of loading capacity	The loading capacity in Cau river basin was estimated in June 2017.	The calculated loading capacity was used for logical allocation of discharge quota, and examination of possible measures for reducing pollution load.
4	Allocation of tentative discharge quota logically	The tentative allocation of logical discharge quota was conducted in August 2017.	The allocated logical discharge quota was used for examination of possible measures for reducing pollution load.
5	Trial examination on effectiveness of possible measures for reducing pollution load considering allocated discharge quota	The examination of effectiveness of possible measures for reducing pollution load was discussed from October 2017 to March 2018.	Experiences on examination of possible measures for reducing pollution load could be used for reflecting loading capacity assessment result to SEDP preparation in future.
Developing and Operation of WDSI			
1	Developing WDSI	The WDSI for the Pilot Project area was developed.	The obtained outcomes is upgraded by co-working through the Advanced Training Program.
2	Developing pollution source map	The pollution source map for the Pilot Project area was developed.	The obtained outcomes is upgraded by co-working through the Advanced Training Program.
3	Operating the developed WDSI by the concerned provinces	C/Ps had hands-on training to operate the developed WDSI and the pollution source maps.	The obtained outcomes iscontribute for the daily activities of the staff in concerned provinces.

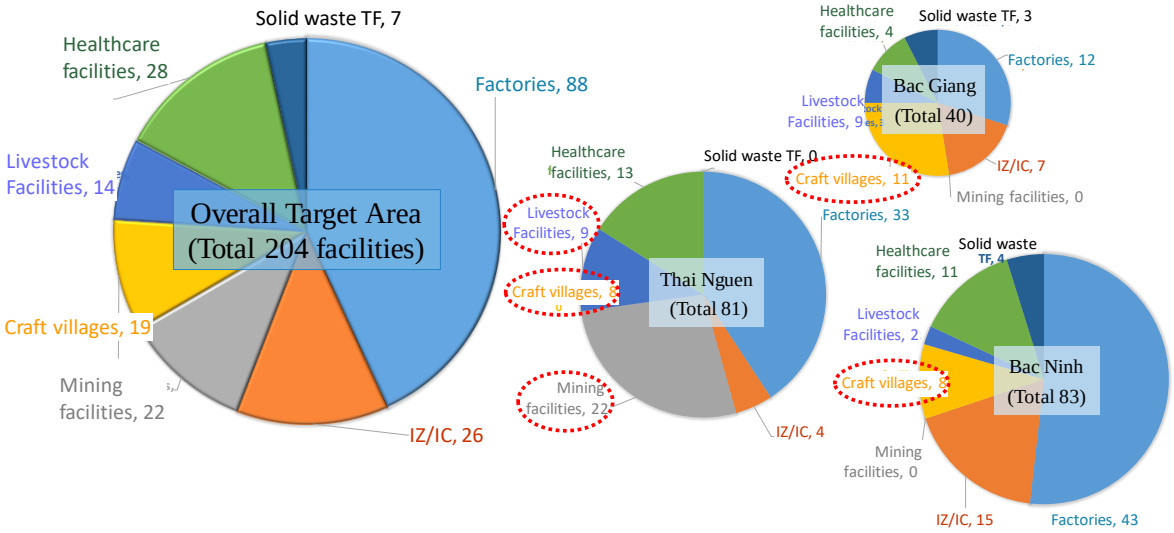
Source: JET

i) Assessment of Wastewater Discharge Source Inventory (Pollution Source Inventory)

In the Pilot Project area, to acquire data and information for water pollution control activity and river basin water environmental management, wastewater discharge source inventory (WDSI), targeting large size of wastewater discharge sources, was developed. The collected data and information were stored in Excel datasheet, and summarize characteristics of wastewater discharge source, such as type of wastewater discharge sources, ratio of facilities having EIA/EPP/EPC approval and wastewater discharge license, or implementing wastewater monitoring. These kinds of information are useful for planning and implementation of wastewater management. In addition, based on the collected data, discharge pollution load was calculated, which can be used for regional pollution load analysis and estimation of loading capacity.

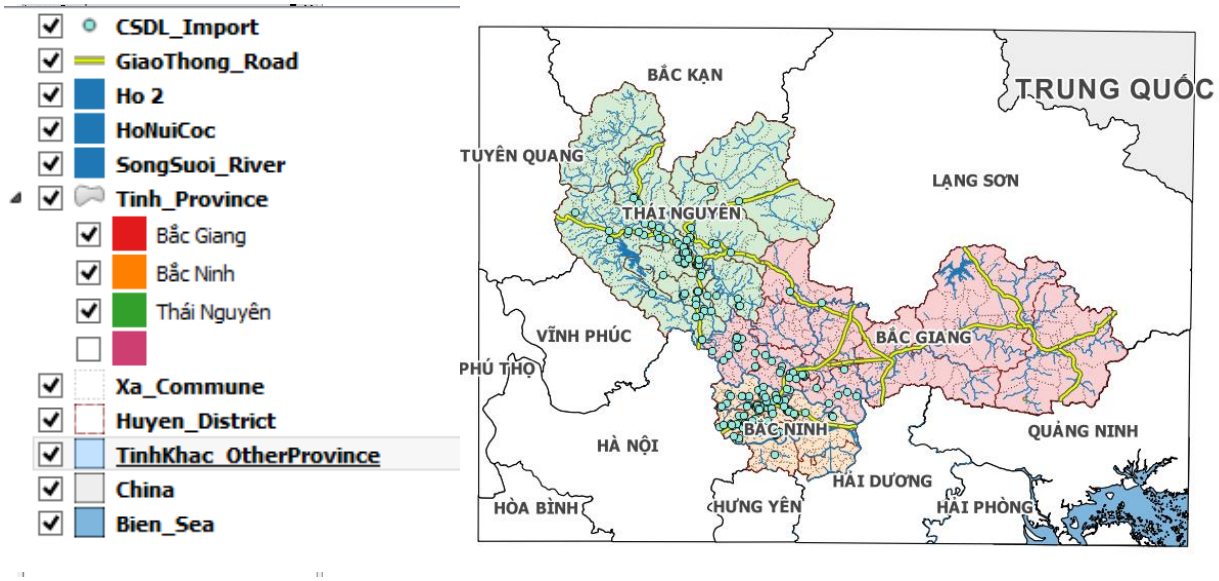
Under the PPs activity, a pollution source map was also developed with GIS, that is another effective tool for wastewater management showing location of wastewater discharge sources with characteristic of them. The map can be used not only for administrative work, but also awareness raising by sharing visible information with local residents and relevant stakeholders.

Figure 5-3 and Figure 5-4 shows information summarized from WDSI, and wastewater discharge source map prepared by the PPs, respectively.



Source: JET

Figure 5-3 Example of Summarzed Information based on Prepared WDSI



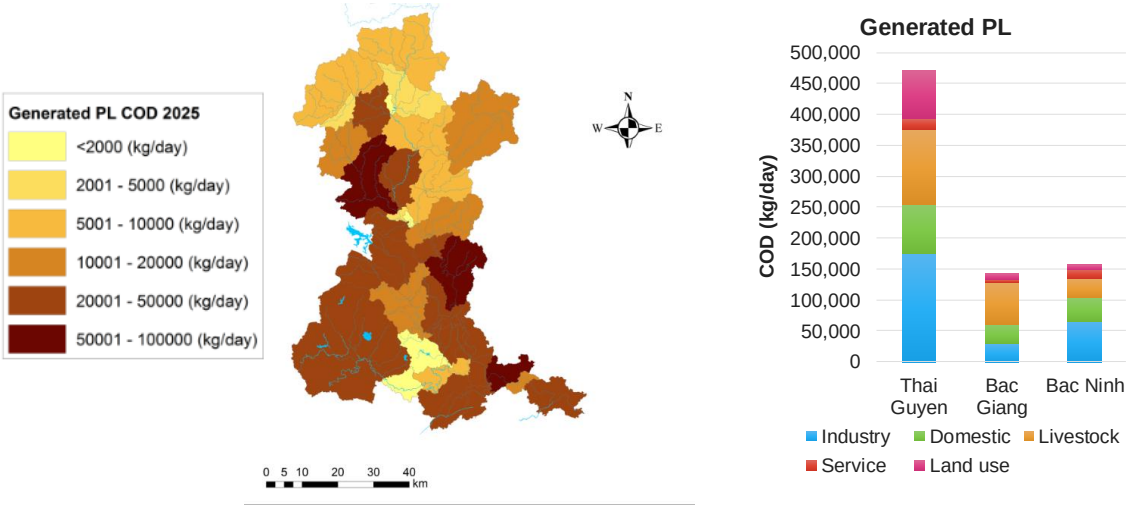
Source: JET

Figure 5-4 Wastewater Dsicharge Source Map in Cau River Basin

ii) Result of Pollution Load Analysis

The pollution load analysis was conducted based on exiting statistical data such as population and industrial yield with available pollution load units set in Vietnam and other countries.

Pollution load was estimated by type of pollution source in target provinces in Cau river basin. The amount was also divided into each sub-basin of the Pilot Project area, and prepared a map showing difference of generated pollution load in each sub-basin. The result of estimation is shown in Table 5-3.

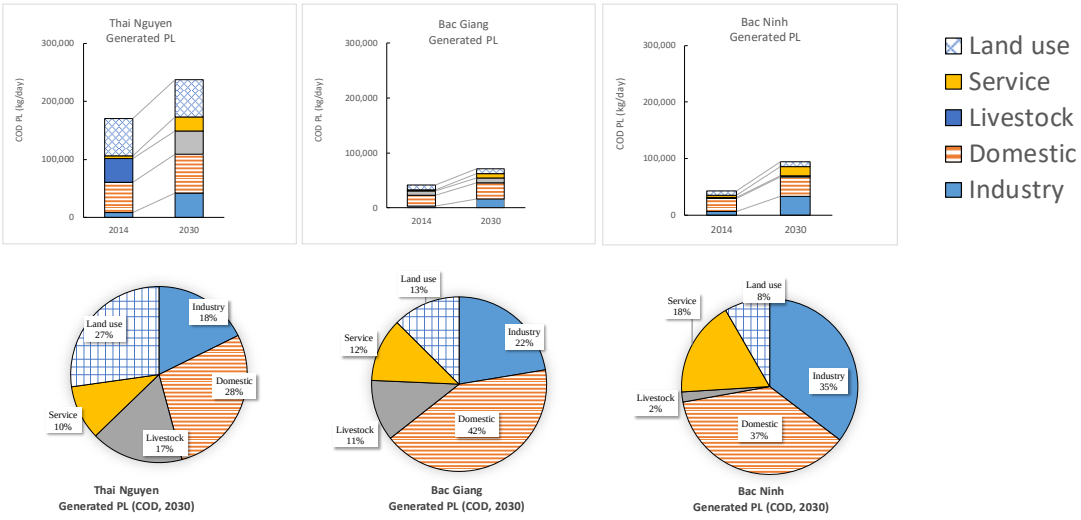


Source: JET

Figure 5-5 Generated COD (kg/day) in Cau river basin

iii) Assessment of contribution of pollution load at the observation point

From the viewpoint of pollution load control for river basin management, it is important to assess the amount and type of sources of pollution load in the target year of planning for RBWEM. In the Project, future pollution load amount in 2025 and 2030 were calculated. Figure 5-6shows the pollution load analytical result in 2030 in Cau river basin. The figures shows difference of contribution ratio of each type of pollution source. This kind of information can be used for examination of effective pollution load management depending on characteristic of pollution source types in each province in the target river basin.



Source: JET

Figure 5-6 Contribution of pollution load by each sector

iv) Estimating Scientific Loading Capacity

Based on the pollution load analysis and hydrological analytical result, scientific-based loading capacity was estimated with water quality simulation model, named QUAL 2K at the most downstream point. The estimated amount in the PP area is shown in Table 5-17. According to the estimated result, 90% of pollution load in Cau river basin would be discharged from the pilot project area. In the pilot project area, Thai Nguyen province had largest contribution ratio of pollution load, of which value was 40%. Bac Ninh province had same level of contribution ratio, of which value was 37%. The contribution ratio of Bac Giang province was estimated as 13%. In the PP, scientific loading capacity for satisfying A1 level and B1 level of environmental standards were calculated, based on the contribution ratios mentioned above. These estimated science-based loading capacity could be used as basic information to set allocate acceptable pollution load discharged from each province, considering each province socio-economic development plan, and RBWEM, by discussion and coordination among the provinces.

Table 5-17 Results of Loading Capacity Estimation

Province		Thai Nguyen	Bac Giang	Bac Ninh	Total from PP area	From upstream area of PP area
Contribution Ratio (%)		40.0%	13.0%	37.0%	90.0%	10.0%
Scientific Loading Capacity (kg/day)	Env. Std (A1)	105,728	34,361	97,798	237,887	26,432
	Env. Std (B1)	343,615	111,675	317,844	773,133	85,904

Source: JET

5.4.2 Implementation of PPs in Dong Nai River Basin

The results and outcomes of PPs are shown in Table 5-18.

Table 5-18 Results of PPs in Dong Nai River Basin

No.	Items	Results	Outcome/ Findings
Developing simulation model for calculating loading capacity and tentative discharge quota logically			
1	Pollution load analysis	The pollution load analysis has been conducted in the pilot areas in March 2017.	The obtained outcomes were upgraded by co-working through the Advanced Training Program.
2	Construction of simulation model	The simulation model for the Pilot Project area was developed in May 2017.	JET used the model for calculating loading capacity and science-based discharge quota.
3	Calculation of loading capacity	The loading capacity in Cau river basin was estimated in June 2017.	The calculated loading capacity was used for logical allocation of discharge quota, and examination of possible measures for reducing pollution load.
4	Allocation of tentative discharge quota logically	The tentative allocation of logical discharge quota was conducted in August 2017.	The allocated logical discharge quota was used for examination of possible measures for reducing pollution load.
5	Trial examination on effectiveness of possible measures for reducing pollution load considering allocated discharge quota	The examination of effectiveness of possible measures for reducing pollution load was discussed from October 2017 to March 2018.	Experiences on examination of possible measures for reducing pollution load could be used for reflecting loading capacity assessment result to SEDP preparation in future.

No.	Items	Results	Outcome/ Findings
Developing and Operation of WDSI			
1	Developing WDSI	The WDSI for the Pilot Project area was developed.	The obtained outcomes were upgraded by co-working through the Advanced Training Program.
2	Developing pollution source map	The pollution source map for the Pilot Project area was developed.	The obtained outcomes were upgraded by co-working through the Advanced Training Program.
3	Operating the developed WDSI by the concerned provinces	C/Ps had hands-on training to operate the developed WDSI and the pollution source maps.	The obtained outcomes contributed for the daily activities of the staff in concerned provinces.

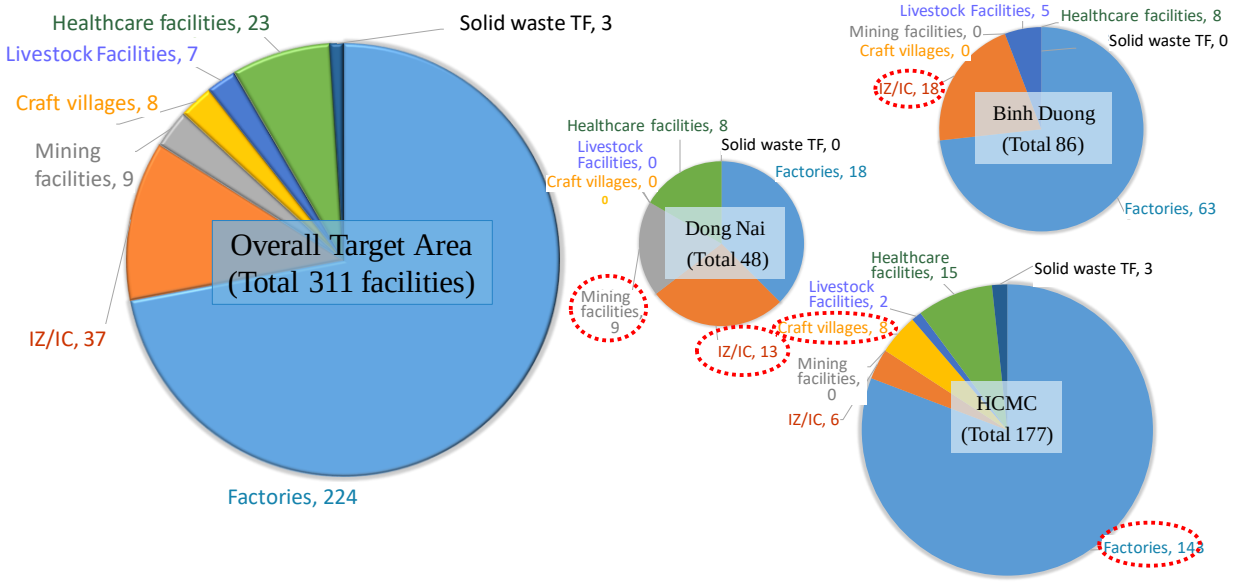
Source: JET

i) Assessment of Wastewater Discharge Source Inventory (Pollution Source Inventory)

In the Pilot Project area, to acquire data and information for water pollution control activity and river basin water environmental management, wastewater discharge source inventory (WDSI), targeting large size of wastewater discharge sources, was developed. The collected data and information were stored in Excel datasheet, that summarized characteristics of wastewater discharge source, such as type of wastewater discharge sources, ratio of facilities having EIA/EPP/EPC approval and wastewater discharge license, and implementing wastewater monitoring. These kinds of information are useful for planning and implementation of wastewater management. In addition, based on the collected data, discharge pollution load was calculated, which can be used for regional pollution load analysis and estimation of loading capacity.

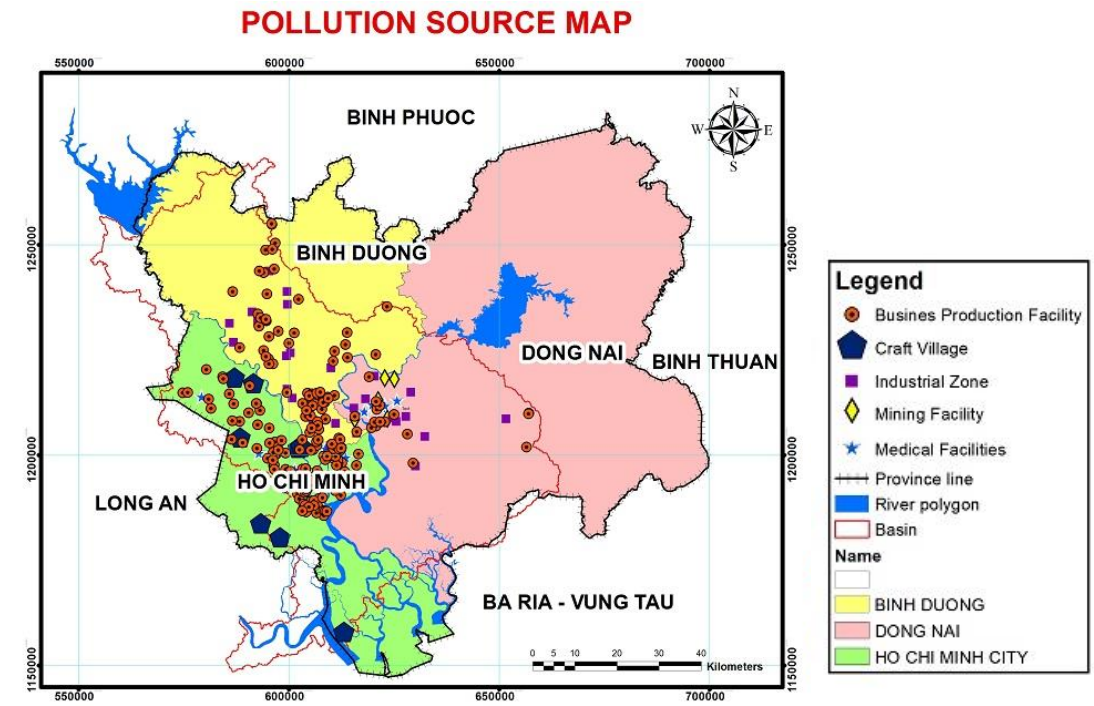
Under the PPs activity, a pollution source map was also developed with GIS, that was another effective tool for wastewater management showing location and characteristics of wastewater discharge sources. The map can be used not only for administrative work, but also awareness raising by sharing visible information with local residents and relevant stakeholders.

Figure 5-7 and Figure 5-8 shows information summarized from WDSI, and wastewater discharge source map prepared by the PPs, respectively.



Source: JET

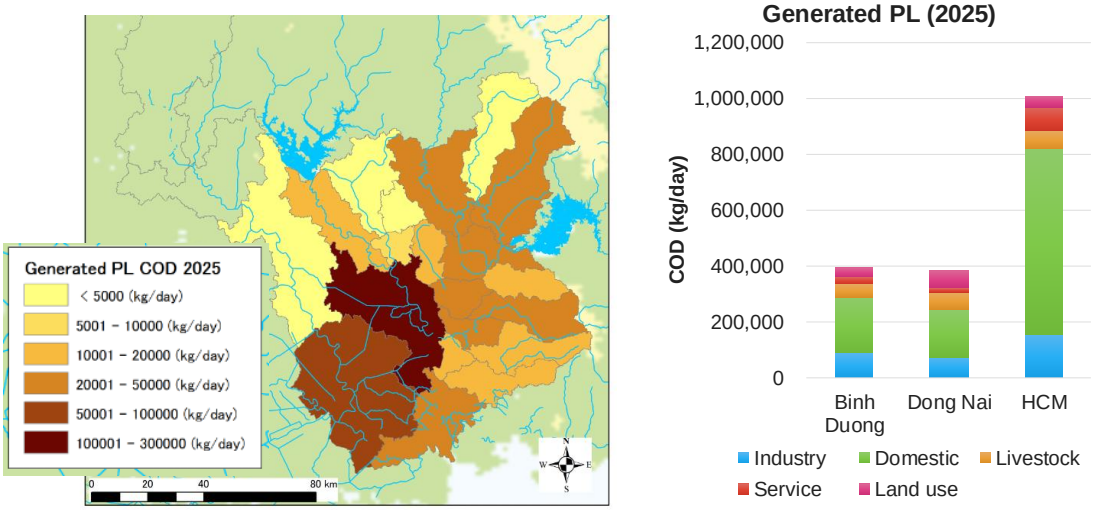
Figure 5-7 Example of Summarized Information based on Prepared WDSI



Source: JET

ii) Result of Pollution Load Analysis

The pollution load analysis was conducted based on exiting statistical data such as population and industrial yield with available pollution load units set in Vietnam and other countries. Pollution load was estimated by type of pollution source in target provinces in Dong Nai river basin. The amount was also divided into each sub-basin of the Pilot Project area, and prepared a map showing difference of generated pollution load in each sub-basin. The result of estimation is shown in Figure 5-8.

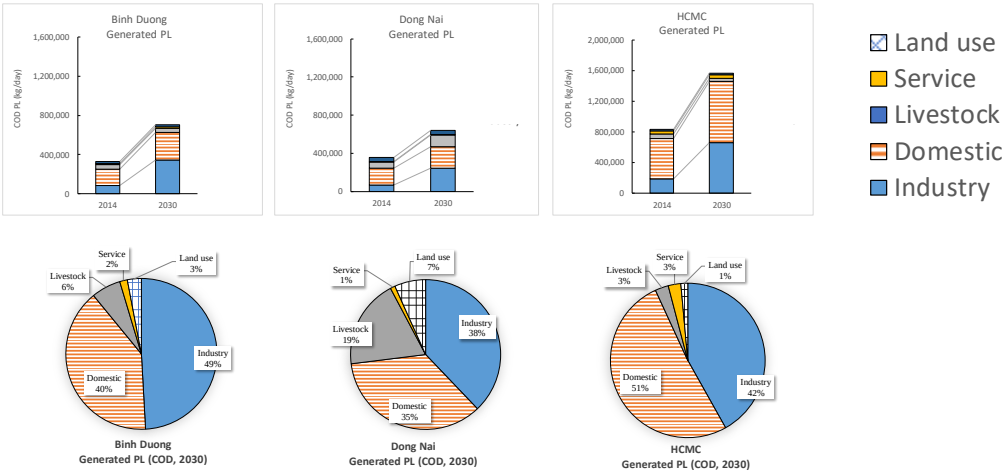


Source: JET

Figure 5-8 Generated COD (kg/day) in Dong Nai river basin

iii) Assessment of contribution of pollution load at the observation point

From the viewpoint of pollution load control for river basin management, it is important to assess the amount and type of sources of pollution load in the target year of planning for RBWEM. In the Project, future pollution load amount in 2025 and 2030 were calculated. Figure 5-9 shows the pollution load analytical result in 2030 in Dong Nai river basin. The figures shows difference of contribution ratio of each type of pollution source. This kind of information can be used for examination of effective pollution load management depending on characteristic of pollution source types in each province in the target river basin.



Source: JET

Figure 5-9 Contribution of pollution load by sector

iv) Estimating Scientific Loading Capacity

Based on the pollution load analysis and hydrological analytical result, scientific-based loading capacity was estimated with water quality simulation model, named MIKE 11 at the most downstream point. The estimated amount in the PP area is shown in Table 5-19. According to the estimated result, 56% of pollution load in upper Dong Nai river basin would be discharged from the pilot project area. In the pilot project area, Ho Chi Minh city had largest contribution ratio of pollution load, of which value was 26%. Binh Duong province and Dong Nai province had same level of contribution ratios, of which values were 17% and 14% respectively. In the PP, scientific loading capacity for satisfying A1 level and B1 level of environmental standards were calculated, based on the contribution ratios mentioned above. The estimated science-based loading capacity could be used as basic information to set allocate acceptable pollution load discharged from each province, considering each province's/city's socio-economic development plan and RBWEM,by discussion and coordination among the relevant provinces.

Table 5-19 Results of Loading Capacity Estimation

Province		Binh Duong	Dong Nai	Ho Chi Minh	Total from PP area	From upstream area of PP area
Contribution Ratio (%)		16.7%	13.6%	25.7%	55.9%	44.1%
Scientific Allocation (kg/day)	Env. Std (A1)	299,782	243,910	461,104	1,004,796	792,692
	Env. Std (B1)	1,405,520	1,143,565	2,161,871	4,710,957	3,716,515

Source: JET

5.4.3 Implementation of Public Awareness

As described in "5.3.4 PPs Implementation Plan for Public Awareness", public awareness events were organized in Bac Giang Province as one of pilot project activities. The followings are results of these events.

(1) Implementing Environmental Awareness Activities

i) Contents and Participants

3 times of public awareness events were planned and conducted to raise local students awareness on river water environmental management in Bac Giang Province. Date, contents, and participants are summarized in Table 5-20.

Table 5-20 Summary of Public Awarenss Event in Bac Giang Province

No.	Date	Contents	Participants
1st Event	25 August 2017	- Lecture on water quality status of Cau river basin before going to the field - Instructing students, the way to use Multi Meter and Test Kit - Distributing the communication materials for environmental awareness raising event	Teachers and students of Tran Nguyen Han Secondary School, Bac Giang City, consisting 40 Students and 10 Teachers
	26 August 2017	Carry out water sampling and field analysis at three locations from upstream to downstream of Cau river through Bac Giang Province Location 1) Vat Bridge, Hiep Hoa District Location 2) Dap Cau Bridge, Viet Yen District Location 3) Yen Lu Bridge, Yen Dung District	
2nd Event	22 September 2017	- Lecture before going to the field - Instructing students, the way to use Multi Meter and Test Kit - Distributing the communication materials for environmental awareness raising event	Teachers and students of Thai Thuan upper Secondary School, Bac Giang City, consisting 40 Students and 10 Teachers
	23 September 2017	Conduct the take water sample and field analysis at 3 locations from upstream to downstream of Cau river which flows through Bac Giang Province. Location 1) Vat Bridge, Hiep Hoa District Location 2) Dap Cau Bridge, Viet Yen District Location 3) Yen Lu Bridge, Yen Dung District	
3rd Event	20 October 2017	- Give lecture before field trip - Instructing students, the way to use Multi Meter and Test Kit - Providing the communication materials for environmental awareness raising event Carry out water sampling and field analysis at three locations from upstream to downstream of Cau river through Bac Giang Province Location 1) Cau Vat, Hiep Hoa District Location 2) Dap Cau Bridge, Viet Yen District Location 3) Yen Lu Bridge, Yen Dung District	Student and teachers of Bac Giang Specialized Upper Secondary School, consisting of 43 Students and 11 Teachers

Source: JET

In the public awareness activity, the following activities were implemented.

- Provide preliminary lecture to grasp current water quality status of Cau river basin,

- Conduct field water quality analysis with “TEST KIT” that can show concentration of main water quality parameters by difference of color depth,

- Discuss on actions to be taken for river water environmental management, based on the field analytical results.

Photos of preliminary lecture and field water quality analysis are shown in Figure 5-10.

Explanation to Participants, before field trip

Using Testkit to check water quality

On site lecture by JET

Commemorative photo

Source: JET

Figure 5-10 Photos of Public Awareness Raising Events

ii) Main Comments from participants

Through the field water quality analysis, local students grasped that water quality in Cau river basin in Bac Giang province was generally moderate level, and a part of analytical results exceeded river water environmental standard. Almost all of participants were satisfied with the events and realized how environment is important. The following are main comments from participants:

- The water quality survey was useful, meaningful, raising awareness and understanding of water environment, importance of water, helping to understand more about Cau river, seeing the pollution level of Cau river water
- To have intention for conducting more surveys in many rivers
- To have intention for analyzing more water quality parameters

- To have to take required actions to conserve water environment by ourselves

(2) Materials for Environmental Awareness Raising Event

i) Analysis Instrument

Through environmental awareness raising events, "Multi Meter" and "TEST KIT" were used for analyzing water quality by the participants. Analysis instruments are shown in Figure 5-11. One of the advantages of these apparatuses is to find rough polluted level of water quality visibly and rapidly in the field by simple field analysis of representative parameters. For public awareness activities, the characteristic of these apparatuses, showing water quality visibly in the field, is quite preferable to make targets understand the water quality condition. In the awareness raising activity of the Project, local students showed strong concern on change of color in the Test Kit, and the apparatuses contributed to raising their awareness on necessity of grasping current water quality condition.

Source: JET, Subcontract work

Figure 5-11 Photos of "Multi Meter (Left)" and "Test Kit (Right)

ii) Communication Materials for Environmental Awareness raising Event

Designing communication materials (T-shirts, caps, water bottles) for environmental awareness activities and preparing them. Products are shown in Figure 5-12. These communication materials could be used for further awareness raizing activity in post-project phase.

Source: JET, Subcontract work

Figure 5-12 Photos of Communication Materials Used to Environmental Awareness Event

(3) Results of Information Sharing of the Activities

JET, Bac Giang DONRE, and the subcontractor developed materials for information sharing including several web-material and to disseminate the activity results. Results were shared through several media as shown in Figure 5-13 to Figure 5-16.

- Bac Giang DONRE has web-site and E-newspaper as public awareness tool. The awareness raising activities in the Project were introduced with the tools by Bac Giang DONRE. Those tools explained detail information on local students and promote awareness activity by local people.
- Bac Giang News paper covered the awareness raising activity of the Project. The newspaper explained that the student measured pH, COD, $NH4^{+}$, and iron on site by quick test kit from Japan. The newspaper also noted that students understood current water quality condition based on results of test, and would share their understanding of water environment protection to friends, family and so on.
- Bac Giang DONRE reported the awareness raising activity to VEA, and VEA Environmental Magazine introduced the activity. The magazine explained water quality analysis done by Cau river, and concluded that the activity is one of meaningful outcomes by the Project.

Source: Bac Giang DONRE

Figure 5-13 Introducrtion of Awareness Raising Activity by Website and E-Newspaper of Bac Giang DONRE

Trải nghiệm thực tế bảo vệ môi trường nước lưu vực sông Cầu

Ngày 23-9, Cơ quan Hợp tác Quốc tế Nhật Bản (Tổ chức JICA) phối hợp với Sở Tài nguyên và Môi trường, Công ty TNHH Công nghệ môi trường Đất Việt, Trường THPT Thái Thuận (TP Bắc Giang) tổ chức hoạt động trải nghiệm thực tế cho học sinh lấy mẫu phân tích một số chỉ tiêu nước mặt trên lưu vực sông Cầu chảy qua địa bàn các huyện: Hiệp Hòa, Việt Yên, Yên Dũng.

Tại buổi trải nghiệm, giáo viên, học sinh nhà trường được cán bộ kỹ thuật Tổ chức JICA hướng dẫn lấy mẫu, phân tích chất lượng nước tại ba điểm trên lưu vực sông Cầu thuộc xã Hợp Thịnh (Hiệp Hòa), Quang Châu (Việt Yên) và Yên Lư (Yên Dũng); thực hành đo các chỉ tiêu pH, COD, NH4 +, Fe bằng máy phân tích và bộ thử nhanh của Nhật Bản.

Kết quả phân tích cho thấy, chỉ tiêu pH và Fe nằm trong giới hạn cho phép; các chỉ tiêu COD vượt khoảng 1,2 lần, NH4+ vượt khoảng 1,6 lần so với quy chuẩn cho phép. Căn cứ kết quả này, đại diện Tổ chức JICA, Sở Tài nguyên và Môi trường tập trung tuyên truyền, vận động học sinh tiếp tục nâng cao nhận thức, chia sẻ tới bạn bè, người thân thực hiện các giải pháp bảo vệ môi trường nước sông bằng những hoạt động thiết thực như: Không xả nước thải sinh hoạt, chăn nuôi, sản xuất chưa qua xử lý xuống sông Cầu. Được biết, đây là một trong những hoạt động nằm trong khuôn khổ dự án: "Tăng cường năng lực quản lý môi trường nước tại lưu vực sông" của Chính phủ Việt Nam thực hiện thông qua hỗ trợ kỹ thuật từ Tổ chức JICA.

HẢI MINH

Source: JET, Subcontract work

Figure 5-14 Awareness Raising Activity introdued by Bac Giang Newspaper (25 September 2017)

Source: JET, Subcontract work

Figure 5-15 Awareness Raizing Activity introdued by VEA Environment Magazine

5.5 Activity 2-5: Share the Outputs Obtained with Concerned Departments in MONRE/VEA and DONREs in the Target River Basins

The outputs prepared by C/Ps and JET including sub-contract works are shown in Table 5-21. All products were shared to relevant organization through JCC meetings, workshops, TF meetings and PMU meetings. Furthermore, the techniques on pollution load analysis were transfer to C/Ps on program of BTC and ATC. Knowledge and techniques obtained on Output-2 were exercised/practiced through the steps on making of Action Plan in Output-3.

Especially, the training materials used for ATC-1-2 were requested from C/Ps to be compiled and published officially for sharing with the concerned organizations such as DONREs other than target provinces of the Project. Based on the discussion in PMU, the training material was printed as a MONRE publishing, and 500 copies are being distributed to the concerned organizations.

Table 5-21 Products on Output-2 Activities

No.	Product Name	Legislation
1	The training materials on loading capacity assessment	Publish
2	Pollution Load Analysis (Cau river basin)	QUAL2K model
		Report
3	Pollution Load Analysis (Dong Nai river basin)	MIKE11 model
		Report
4	Research on water quality simulation models used for pollution load and loading capacity calculation and recommendation of model for pilot implementation in Cau and Dong Nai rivers	Report
5	WDSI Preparation (Cau river basin)	Data base
6	WDSI Preparation (Dong Nai river basin)	Data base
7	Environmental Awareness to target students	Hold events
8	Review the current institutional of coordination mechanism serving for the water environmental management in river basin	Report
9	Review of current policy, legal and organizational system on assessment of loading capacity and estimation of discharge permit	Report
10	The Review of Current Legal and Institutional System on Main Wastewater Discharge Sources for RBWEM on River Basin Water Environmental Management in Vietnam	Report
11	Review of the current legal and institutional system on collection, management, exploitation and use of information and data for water environmental management in the river basin of Vietnam (RBWEM)	Report

Source: JET

6. Output-3: A Road Map for Improvement of RBWEM is Prepared based on the outcomes of Output-1 and Output-2, and MONRE/VEA is Ready to Implement Further Steps toward the Integrated River Basin Water Resource Management (IRBWRM)

6.1 Activity 3-1: Integrate all Outputs of the Project and Reflect it to the Draft Circulars in Output-1

In the Project, the final draft circulars and relevant legislative documents were prepared under Output-1. For preparing the documents, lessons and opinions obtained from C/Ps through PPs were referred. The lessons and opinions were confirmed through the several technical meetings with national experts who usually collaborate with MONRE/VEA, TF meetings and workshop with target DONREs. VEA summarized the legislative and other documents to be prepared through the Project, and confirmed in 4th JCC in May 2018, as shown in the table below.

Table 6-1 Legislative Document prepared by the Project

PDM (version 02)	Direction and Development Way	Way of Integrating Lessons in Output-2
1) Circular-1: Legislative document on coordination mechanism for RBWEM	*1)* A Guideline for coordination mechanism for RBWEM was prepared. Main content was as follows: a) To guide procedure/ responsible organization of approval on allocated loading capacity among province, and b) To suggest key issue to consider for allocation of loading capacity among province.	Discussions on coordination mechanism in TF meetings were referred.
2) Circular-2: Circular on assessment of loading capacity and estimation of discharge quota	*1)* The final draft Circular-2 was prepared by the Project, and integrated with revised circular by DWRM, and developed as Circular 762017/TT-BTNMT "Regulating assessment of wastewater receiving capacity and loading capacity of rivers and lakes".	Experiences and lessons of PPs for calculating loading capacity were referred through the technical meetings.
	2) The technical Guideline (TG) for Calculating Loading Capacity was finalized as VEA Decision No.154.	Experiences and lessons of PPs for calculating loading capacity were referred through the technical meetings.
3) Circular-3: Circular on main wastewater discharge sources for RBWEM	*1)* The final draft Circular-3 on Main Wastewater Discharge Sources for RBWEM was prepared.	Experiences and lessons of PPs for calculating loading capacity were referred through the technical meetings.
	2) The Technical Manual on WDSI Development for RBWEM was prepared.	
4) Circular-4: Circular on information sharing and disclosure system for inter-provincial RBWEM	*1)* The final draft Guidelines of Data and Information Sharing for Loading Capacity Calculation, and Wastewater Discharge Sources Inventory Development was prepared.	Discussions on collecting and sharing required data and information for loading capacity assessment in TF meetings were referred.
5) Circular-5: Decree including regulations on guiding format and procedure of requesting environmental compensation for natural environment	*1)* The revised final draft Decree-03 including environmental compensation process by integrating two draft circulars was prepared.	Discussions on environmental compensation in the consultation workshop were referred.
6) Circular-6: Decree including regulations on stipulating selecting criteria and responsibilities of agency providing environmental monitoring and assessment service to collect evidences compensation and environmental damage; and		

PDM (version 02)	Direction and Development Way	Way of Integrating Lessons in Output-2
guiding the setting up and operation of councils for appraising data and proof for determining environmental damages.		

Source: VEA, JET

6.2 Activity 3-2: Prepare a Program of Training Courses and Conduct Training

VEA, DONREs and JET prepared ATC program in May 2017 and has implemented. ATC for Output-3 was conducted for preparation of the final draft Circular-2 and 3 by discussion between C/Ps and JET. Through these discussions, the detailed paragraphs of the circulars were prepared and discussed with C/P and national experts in the concerned meetings.

Especially, a technical workshop and retreat-meeting were conducted for Circular-2 as main components regarding total pollution load analysis. The retreat meeting was conducted for finalizing the detail contents of Circular-2 and the technical guideline enforced as VEA Decision.

In addition to the Advanced Training Course, JET provided training courses in Japan 3 times. Especially, at the final training in Japan (3rd training in Japan from September 26 to October 4, 2018), several lectures related to the integrated river basin water resource management (IRBWRM) were provided. One of the remarkable lectures was done by Dr. Masahisa Nakamura distinguished visiting professor of Shiga Univ. as follows:

Title: Governance Improvement in Lake Basin Management (ILBM): Lake Biwa and Global Experiences

Lecturer Dr. Masahisa Nakamura Distinguished visiting professor of Shiga Univ.

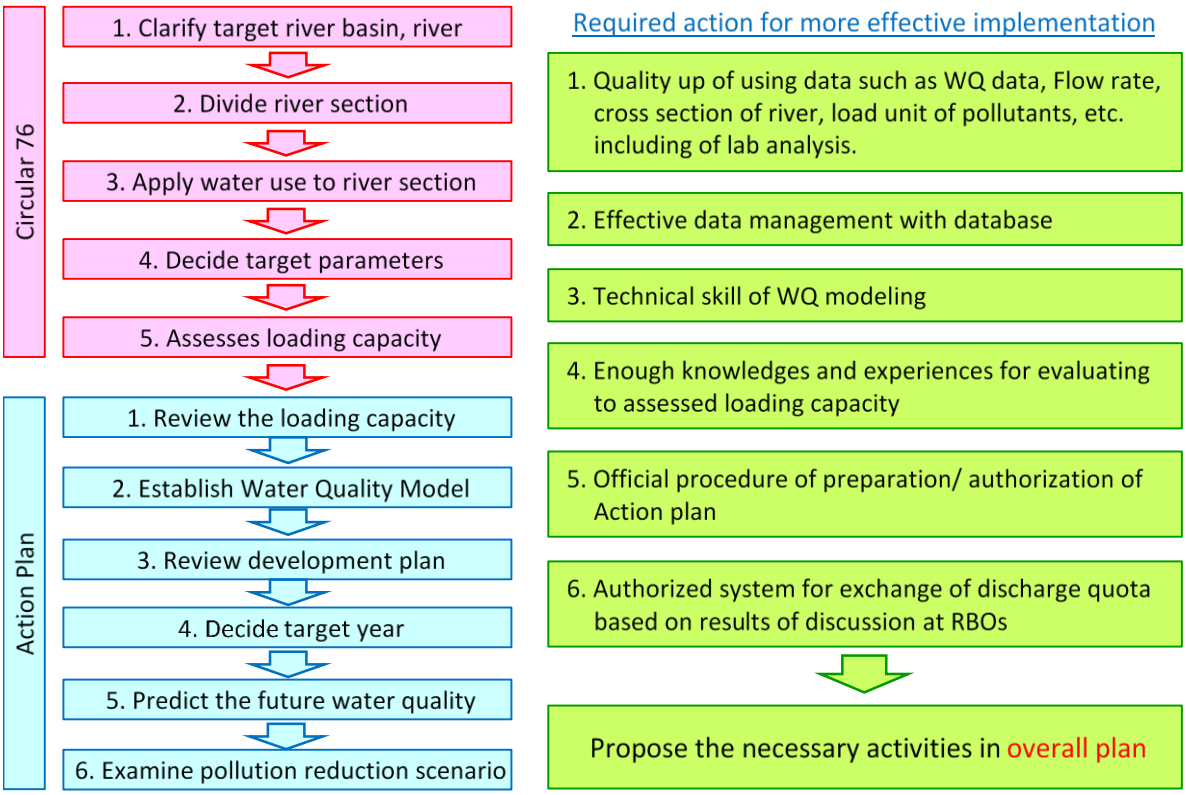
Contents:
- Introduction of Biwa lake and Yodo river
- Water level control, Flow control, Lake Biwa Record Flooding
- Comprehensive Development, Flood Control and Water Resources Development, Water Supply and Sewerage for Downstream, Irrigation and Drainage, Variety of Sewerage Systems
- Achievement of Lake Basin Management (ILBM), Reasons and Results, Water Qualities
- Way Forward, Global experiences (Lessons Learned from 28 Cases), Involving People, Agenda Setting Process, Stakeholder Driven Process, Civic Society Driven Process, Platform Driven Process

6.3 Activity 3-3: Prepare an Action Plan for Improvement of RBWEM Clarifying Roles and Responsibilities of Concerned stakeholders for Implementation

Preparation work of Action Plan has been started from September 2017. In November 2017, tentative future pollution load analysis with pollution load adjustment scenarios were prepared and discussed with VEA and each target provinces.

In the 5th TF meeting held in January 2018, the Action Plan preparation process was shared and discussed with the target DONREs. Relevant DONREs such as Thai Nguyen DONRE and Dong Nai DONRE conducted the assessment of loading capacity in own river basin. The Final Draft Action Plan was prepared in March 2019. The Action Plan preparation process iswas shared and discussed with the new sections in charge of river basin management and RBOs to be developed.

The process of loading capacity assessment examining by the preparation process of Action Plan is closely related to Circular-76. The steps of the examination are shown in the following Figure.



Source: JET

Figure 6-1 Process of Loading Capacity Asssessment Proposed by Action Plan

6.4 Activity 3-4: Develop Overall Plan and Implementation Schedule for Improvement and Institutionalization of RBWEM Mechanism to MONRE/VEA and DONREs in the Target River Basins

The Overall Plan was prepared to implement pollution load analysis and river basin management more smoothly in post project phase. For practical implementation of pollution load analysis and loading capacity assessment for appropriate RBWEM, there are still remaining issues to be improved. The Overall Plan described the proposed activities to address such issues, considering the project outcomes. Based on the lessons obtained through PPs, amount and type of necessary data for pollution load analysis and loading capacity assessment, such as river flow rate, water quality monitoring data, pollutants information from non-points source etc., are larger than ones required for river management by concentration of pollutants. Thus, for RBWEM with total pollution load control approach, it is required to improve quality and quantity of available information and data of river water quality and wastewater discharge sources. Besides this, separating from the conventional river management in individual provinces, coordination among provinces in a basin-wide would be required for appropriate allocation of allowable amount of discharged pollution load. In addition, DONREs pointed out importance on enhancement of existing activities such as strengthen RBWEM capacity of relevant organization or improving quality of monitoring data.

The Overall Plan proposed 3 pillars of activities to be taken for improving institutional and technical capacity for RBWEM with total pollution load control, as shown below;

1) Recommending new regulation / rule for implement to allocation of loading capacity based on Circular 76
2) Strengthening of Existing Organization Capacity for RBWEM

   Identify/ Clarify to key action of strengthening of function on concerning organization
3) Enhancing Systems for Increasing Efficiency and Improving Quality of Concerning Data

The Overall Plan was finalized by discussion with each DONRE and VEA including DWRM for proposing the feasible actions to be taken.

As a results of discussion, the Overall Plan proposed the actions to be taken as shown below:

Table 6-2 Propsoed Actions on Establishment of New Institutional System

No.	Items	Proposed Action	Priority
1	The system of authorization of Action Plan	Action Plan will suggests measures for sustainable water environmental management according to socioeconomic development plan. Therefore, the system for authorization of Action Plan and reflection to development policy will be required.	High
2	Regulation on report the discharge amount from industry	Newly regulated reporting system of discharged pollution load needs to be developed depend on industrial scale	Middle
3	Rule or regulation regarding public hearing	It will be necessary to set criteria, methods and periods for public hearing.	Low
4	Introduction of economic incentive management	Establishment of fund for management of river basin will be required.	Middle

Source: JET

Table 6-3 Proposed Actions on Organization Capacity

No.	Items	Proposed Action	Priority
1	Information collection of domestic wastewater and agricultural wastewater	For estimating both generated and discharged pollution load, the system for collecting wastewater discharge source and river water flow should be enhanced.	Middle
2	CD of MONRE and RBOs	MONRE and RBOs have responsibility on approval of allocated loading capacity of international and inter provincial rivers. MONRE and RBOs have to strengthen capacity for evaluating estimated loading capacity.	High
3	CD of PPC	PPC should strengthen capacity for evaluating estimated loading capacity.	High
4	Socioeconomic development plan and Action Plan	MONRE/VEA and PPC should understand relationship between socioeconomic development plan and Action Plan.	Middle
5	Designing of coordination mechanism with competent authorities under Article 15	VEA needs to make consensus on RBWEM with the concerned authorities	Middle

Source: JET

Table 6-4 Proposed Actions on Enhancing Data and Information Collecting and Sharing System

#	Items	Summary	Priority
1	Re-check the environmental monitoring activity	New monitoring points for loading capacity assessment needs to be set. Duplication of monitoring among related agency needs to be avoided. River water flow rate monitoring needs to be enhanced.	High
2	Efficient data collection and sharing	Database on required data and information for pollution load analysis and loading capacity should be established with collecting information from DONREs.	High
3	QA/QC for analysis in laboratory	For laboratory analysis, ISO/IEC 17025 or equivalent assurance system in Vietnam need to be promoted with participating in proficiency test	Middle
4	Improvement of pollution load unit for pollution load analysis and water quality simulation	It will be necessary to conduct the survey for setting pollution load unit.	Low
5	Setting river section considering water use purpose	Each province and VEA should review existing monitoring condition and set the target river section considering water use purpose based on the criteria of environmental standard with unified concept in a river basin level.	High

Source: JET

Finally, the Overall Plan was submitted to PMU after finalization by reflecting comments from DONREs, DWRM on January 2019. The Overall Plan was presented as basic policy for improvement of RBWEM on target river basins in post project phase at 5th JCC meeting.

6.5 Activity 3-5: Prepare a Road Map including Further Steps toward the Integrated River Basin Water Resource Management (IRBWRM)

JET has conducted review of relevant legal documents to identify critical issues to be addressed in the road map for IWRM. Based on this survey, it is found that basic legal structure has been developed already, and institutional system is also developed. However, for implementing these policies, there are still difficulties and challenging issues such as legal documents overlapping, weak enforcement and lack of the unification and cooperation among line ministry. And, more understanding the concept of IWRM is important.

In addition, one important legal framework is developed recently. The Planning Law in 2017 with its amending, and supplementing 37 regulations have opened a new direction and created a legal basis for integrated management of inter-provincial water sources and inter-provincial river basins. If the water resource management plan is approved under the provisions of the Law on Planning and obtain strong consensus of the local watershed, industries using the river basin and community, it will bethe basis for the local, concerned agencies, branches and subjects to comply with the management, exploitation and use of inter-provincial water sources and inter-provincial river basins.

However, the implementation of water resource planning and integrated inter-provincial river and inter-provincial water sources planning according to the procedures of the 2017 Planning Law and the Law amending, adding 37 Laws is a new movement to Vietnam, so it takes time, human resources, planning consultancy organizations to fully meet the conditions of professional capacity to make the planning, which is not easy.

Based on above mentioned situation, the Road Map proposed that IWRM in Vietnam consist of three pillars. 1) Setting of legal framework, 2) Institutional development, and 3) Arrangement of management tool. At the same time, t the 03 pillars of IWRM described in the Road Map were divided into 5 main categories:

(i) *strategies and policies* to be implemented, including national policies for water resources; specific policies on water resources such as policies related to water exploitation and use; national strategy on water resources until 2030.

(ii) *Legislation on water resources*, including the revision of the Laws related to planning in accordance with the Planning Law. The amendment includes 3 main Laws related to Water Resources, namely the Law on Water Resources 2012, the Environmental Law and the Law on Water Resources and other related Laws.

(iii) *Creating an Institutional Framework* including state administrative management of water resources, river basin management and public and private service organization for the water sector. Institutional framework includes the executive and enforcement agencies of water resources, local authorities, monitoring and evaluation agencies.

(iv) *Capacity building*: is an important activity, including capacity in collecting data; improve professional skills in management, supervision of water resources, exploitation and use of water and supervision of inter-reservoir operation in accordance with law.

(v) *Development of Application tools in IWR*: there are many types of tools in the world. However, with the conditions and qualifications of Vietnam, management tools should be carefully applied. For example, water resource assessment should be done through examination of some hydrological model in the water resources planning and decision. And for the planning of river basin, pollution load allocation and conflict resolution (the relation between upstream and downstream is quite important), economic tools have recently adopted in Vietnam. Information and communication system also is required.

The Road Map describes necessary issues and actions in each category and designs the target year for implementing these.

6.6 Activity 3-6: Research and Develop Incentive Policy to Support RBWEM including Financial Mechanism, Mobilization of Resources, and Incentives

On incentive policy and mechanism of river basin management, even though there were difficulty to lead proper outcomes such as restructuring of VEA and not yet started RBOs functioning currently, discussions to identify incentive policy for RBWEM were made in TF meetings workshops, and PMU meetings. Based on the discussion, it was suggested that one of the important matters for raising incentive for RBWEM was to integrate RBWEM plan into provincial socio-economic plan. If allocation of allowable discharged pollution load is made with considering harmonization of water environmental protection and regional development, RBWEM would have strong incentive to plan and conduct it.

Regarding pricing of incentive against reduced-pollution load, it was discussed with C/Ps. C/Ps understood that it should be discussed and made consensus among members on same river basin. Incentive among river basin would affect strongly by increasing a unit price against reduced pollution load. But required fund for managing the incentive mechanism would become huge amount, and resource of fund would be difficult to be prepared. Inversely, if the price against contamination is too small, it would not function as an incentive. Issues on financial resources was raised from DONREs side especially. As the opinion of DONREs, PPC may not agree to funds to common basin-fund even for functioning some incentive to reduce pollution load. DONRE expected for MONRE/VEA to prepare necessary fund by central level for each river basin.

6.7 Activity 3-7: Finalizing draft Circulars Developed in Output-1

On the initial PDM, draft circulars which are developed in the Project should be promulgated as Circular. However, due to the policy change, an amendment of legal document development process and other changes of condition, the final outcomes have been changed,

And this change was confirmed and approved in JCC meeting. Each circular's final status and style are described in the Attachment 2. This finalizing process is conducted by the Vietnamese side.

6.8 Activity 3-8: Share the Outputs Developed with Concerned Stakeholders

The project team member have a lot of discussion with relevant actors, organization and other donors.

DWRM is very important focal point for the water resource management in Vietnam. Through the series of the discussion, mutual understanding has been developed. Finally, Circular 7 merges the model assessment process and river basin concept.

World Bank conducted one project titled “Vietnam Industrial Pollution Management Project”. This project had similar component with JICA project, “the TMDL (total maximum daily load analysis)”, and we exchanged experiences on total pollution load control with WB’s coordinator and the project management unit. In January 2018, a joint workshop was held. In the workshop, the existing issues on implementation of total pollution load control, such as insufficient available data, and challenges to address such issues were shared and discussed between both projects. This workshop contributed to prepare the proposals in Overall Plan.

And other relevant organization, WRI (Water Resource Institute), NAWAPI (the National Center for Water Resources Planning and Investigation), and VNU (Vietnam National University)-HCMC, and HUST (Hanoi University, Science and Technology) etc., JET discussed and exchange opinions for river basin and water resource management.

Through the implementation of these activities, the project concept and results have been tried to expand and disseminated.

An IWRM workshop was held in April 2017. The concept and framework of plans prepared under Output-3 was shared in 4th JCC meeting in May 2018 and project outcomes dissemination workshop in November 2018. DWRM and other relevant organization have mandate and responsibility for IWRM. For Vietnam, IWRM is a new water resource management manner, so the coordination and cooperation manner between VEA and DWRM in post-project phase need to be confirmed, is based on the discussion made by both organizations in the Project.

7. Achievements of the Project

The achievements of the Project are assessed based on indicator in latest PDM. Achievement of the indicators were evaluated between PMU and JET from December 2018 to January 2019, and documented as the Project monitoring sheet (ver. 6) in January 2019. In addition, achievement from February to April 2019 was evaluated additionally.

7.1 Internal Evaluation of Achievement of the Project Purpose

Achievement of the Project purpose is shown in Table 7-1. The purpose of the Project is that policy development and implementation capacity of MONRE/VEA, and enforcement capacity of target DONREs regarding RBWEM are strengthened and institutionalized, and 5 indicators were set.

Among the indicators set, the most important indicator is that final draft legislative documents (Final Draft Decrees, Circulars or other documents) are submitted to MONRE. The outputs related to this indicator were various types of documents, such as enforced MONRE Circular and VEA Decision, the final draft Decree on environmental compensation, and the guidelines on WDSI development, coordination mechanism and information collecting and sharing. It is considered that this indicator was achieved, since the outputs were obtained in all of 6 target fields. In addition, as shown in achievement of the indicator 3 and 4 in Table 7.1, the relevant organizations were started the state management activities for RBWEM. Based on these outcomes, it is considered that the Project purpose was achieved.

Table 7-1 Internal Evaluation of Achievement of the Project purpose

Project purpose	Indicator	Output	Evaluation
Policy development and implementation capacity of MONRE/ VEA, and enforcement capacity of target DONREs regarding RBWEM are strengthened and institutionalized.	1. MONRE/VEA and relevant agencies submits the final draft legislative documents (Final Draft Decrees, Circulars or other documents) to the Minister of MONRE.	1) VEA has issued a new Circular on loading capacity assessment. 2) VEA also decided type of legal documents to be developed through the Project, and is conducting a process for issuing VEA decision on a technical guideline for loading capacity assessment.	1) Based on six (6) legislative documents prepared by the Project, a Circular for loading capacity assessment was developed. In addition, Circular-5 and Circular-6 were documented as a part of Final draft Decree, and are under process of legalizing as Decree. Based on the output, it can be said that three (3) final draft legislative documents was / being prepared. For achievement of this indicator, VEA clarified the schedule to proceeding legalizing process in the post-project phase, based on the schedule of revising LEP. 2) Other than six (6) draft legislative documents, a VEA decision as a guideline for loading capacity assessment is being prepared. In addition, the contents of the technical guideline for pollution source inventory development is being reflected to the implementation plan of Decree 140 for development of pollution source inventory. These outcomes would also contribute to implementation of RBM in post project phase.
	2. MONRE/VEA share the policy regarding RBWEM mechanism among MONRE/VEA and relevant	1) Thai Nguyen, Bac Ninh, Binh Duong, and Dong Nai provincial DONREs has started trial activities on pollution load analysis or examination of loading capacity.	The trial activities described as output of this indicator were conducted based on the shared policy regarding RBWEM through the Project. Therefore, it is considered that this

Project purpose	Indicator	Output	Evaluation
	organizations.		indicator was achieved.
	3. MONRE/VEA commences necessary activities in accordance with the Action Plan and Overall Plan of RBWEM targeting 2020.	1) Through the activities of the Project, VEA communicated with the target DONREs for proceeding RBWEM with pollution load analysis and loading capacity assessment. 2) The Action Plan and Overall Plan, based on the project activities, were prepared, and reported in 5th JCC in April 2019.	As outputs described, VEA commenced necessary activities with the target DONREs related to Action Plan and Overall Plan. Therefore, this indicator was achieved.
	4. Local authorities explicitly state policy on RBWEM in their water environmental management activity.	1) 4 of target provincial DONREs has started trial activities to reflect pollution load analysis or loading capacity assessment to environmental management plan, such as Cau river basin in Thai Nguyen and Bacn Ninh province, Buong river basin in Dong Nai Province, and tributary of Dong Nai river basin in Binh Duong province.	As outputs described, there were provinces considering RBWEM in their water environmental management activity. Therefore, it was considered that this indicator was achieved.
	5. MONRE/VEA prepares the road map of IRBWRM proposed.	1) IWRM Road Map was prepared, and shared with VEA and relevant organizations in the final JCC and workshop in May 2019.	As the output described, VEA prepared and reported IWRM Road Map. Therefore it was considered that his indicator was achieved.

Source: JET

7.2 Achievement of Output-1

Achievement of Output-1 is shown in Table 7-2. The Output-1 is that capacity of MONRE/VEA and target DONREs in legal document development and enforcement on RBWEM is strengthened, and MONRE/VEA is going to institutionalize RBWEM mechanism. The indicators for evaluating achievement of Output-1 are preparing of the final draft legislative documents, and capacity development by the technical training. Through the Project, the final draft or enforced legislative documents were prepared, and enhancement of skills and knowledge on RBWEM with pollution load analysis and loading capacity assessment were confirmed.

Table 7-2 Internal Evaluation of Achievement of Output-1

Output-1	Indicator	Output	Evaluation
Capacity of MONRE/ VEA and target DONREs in legal document development and enforcement on RBWEM is strengthened, and MONRE/ VEA is going to institutionalize RBWEM mechanism.	1-1 MONRE/VEA prepares more than three (3) final draft legislative documents (Final Draft Decrees, Circulars or equivalent documents) in the following six (6) draft legislative documents in cooperation with the JICA Expert Team (JET).	1) The final draft Guideline on Coordination Mechanism for RBWEM was prepared. 2) Based on the proposal provided by the draft Circular-2, VEA discussed with DWRM on the contents of the circular on loading capacity assessment, and issued the Circular 76 on "Regulating assessment of wastewater receiving capacity and loading capacity of rivers and lakes" in March 2018. VEA also decided to prepare a technical guideline for loading capacity assessment, based on the technical guidelines prepared by the Project. The legalizing process was finalized. 2) PMU and JET prepared draft Circular-3 with technical institutional issues to be addressed by developing regulation in the circulars. VEA considers to prepare a technical guideline on waste discharge source inventory development for not only water environmental management, but also air environment and solid waste management. VEA considers to reflect the ideas proposed by Final Draft Circular-3 and its technical guideline, based on the Decision No.140/2018/QĐ-Ttg. JET cooperated with VEA closely to proceeding this approach. 3) The final draft Guideline of Data and Information Sharing for Loading Capacity Calculation and WDSI Development was prepared. 4) The final draft of Circular-5 and Circular-6 were prepared. And based on these draft Circulars, one draft Decree for the compensation has been developed. For authorization of this draft decree, it has to be nominated in MONRE official list. The legalizing process is being conducted.	1) Based on six (6) legislative documents prepared by the Project, a Circular for loading capacity assessment was developed. In addition, the final draft Circular-5 and Circular-6 are under process of legalizing as Decree. Based on the output, it can be said that three (3) final draft legislative documents were / being prepared. VEA plans to legalize the Decree including the contents of Circular-5 and Circular-6 after finalizing the final draft version of revised LEP in the post-project phase. 2) Other than six (6) draft legislative documents, a VEA decision as a guideline for loading capacity assessment is being prepared. In addition, the contents of the technical guideline for pollution source inventory development is being reflected to the implementation plan of Decree 140 for development of pollution source inventory. These outcomes would also contribute to implementation of RBWEM in post project phase.
	1-2 More than 10 C/Ps (80%) receive technical training, more than 6 C/Ps (50%) obtain enough skills and knowledge for development of policies and actual state management activities of RBWEM.	1) The Vietnamese side has assigned 19 staff for JCC and PMU, 18 staff for TF, and 92 staff for WG. VEA and DONREs show strong interest in outputs and technical trainings to be conducted by JET. 2) Advanced Training Course (ATC) for discussion on policies of RBWEM with Japanese case study was conducted in June 2017, and 54 C/Ps were participated, and obtained knowledge. 3) For discussing state management activities on RBWEM, JET conducted the 1st Study Tour (ST) in Dong Nai river basin in September 2016 with inviting C/Ps of Cau river basin, and 2nd Study Tour (ST) in Cau river basin in September 2017, with inviting C/Ps of Dong Nai river basin. A total of 117 C/Ps participated in the two study tours.	For the Project, 92 of administrative officers were assigned as WG members. Among them, 54 of administrative officers were received training and obtained knowledge on policies of RBWEM. Comparing the number of such officers with WG members, the ratio was 58%, and the figure was smaller than 80%, which was set as indicator on ratio of C/Ps receiving technical training. However, the number of officers itself was 54, and larger than 10, which was set as indicator. Therefore, it was considered that the

Output-1	Indicator	Output	Evaluation
		4) JET conducted the 1st training course in July 2016 in Japan for management-level administrative officers of VEA and DONREs, and the 2nd training course in July 2017 in Japan for technical officers of VEA and DONREs. A total of 21 C/Ps participated in the two training course. 5) JET held 3rd training course in Japan from September to October 2018. 6) Based on the skill and knowledge, Thai Nguyen, Bac Ninh, Binh Duong, and Dong Nai provincial DONREs has started trial activities on pollution load analysis or examination of loading capacity.	effectiveness of training was larger than one expected at the initial phased of the Project, and the indicator was achieved.

Source: JET

7.3 Internal Evaluation of Achievement of Output-2

Achievement of Output-2 is shown in Table 7-3. The Output-2 is that enforcement capacity on RBWEM of MONRE/VEA and target DONREs is strengthened through implementation of Pilot Projects (PPs). The indicators for evaluating achievement of this output are status of skill and knowledge for implementing RBWEM. Through evaluation of the indicators, it was confirmed that C/Ps' capacity on RBWEM with pollution load analysis and loading capacity assessment was enhanced.

Table 7-3 Internal Evaluation of Achievement of Output-2

Output-2	Indicator	Output	Evaluation
Enforcement capacity on RBWEM of MONRE/ VEA and target DONREs is strengthened through implementation of Pilot Projects (PPs).	2-1 More than 80% of activities of PPs in Cau and Dong Nai river basins are completed	1) Wastewater Discharge Source Inventory (WDSI) development in the pilot area was finalized. 2) Pollution load analysis was finalized. 3) Basic Training Course (BTC) was conducted from September 2016 to March 2017. 4) Advanced Training Course (ATC) was conducted from June to September 2017. 5) Above outcomes were conducted in both target river basin, as planned. Therefore, it was considered that 100% of activities of PP in Cau and Dong Nai river basins were completed.	100% of the planned PPs activities were conducted. Therefore, the indicator was achieved.
	2-2 More than 50 C/Ps (70%) receive technical training, more than 35 C/Ps (50%) obtain enough skills and knowledge for development of enforcement tools and actual state management activities of RBWEM	1) Through BTC implemented from September to March 2017, 285 C/Ps and relevant organizations officers were participated in the trainings. 2) ATC provided enough skills and knowledge for development of policies and actual state management activities of RBWEM. From June to September 2017, 134 C/Ps from VEA and the target provinces were trained. According to the 53 of questionnaire result to the trainees, the those trainees enhanced understanding on pollution load analysis, and water quality simulation model.	For the Project, 92 of administrative officers were assigned as WG members. For the ATC on pollution load analysis and loading capacity assessment, 134 (146% of WG members) of administrative officers were received training and 53 (58% of WG members) of them were recognized enhancing their understanding on d knowledge on pollution load analysis, and water quality

Output-2	Indicator	Output	Evaluation
			simulation model. Therefore, it was considered that the indicator was achieved.
	2-3 More than 30 C/Ps (40%) obtain enough skills and knowledge for planning and implementation of RBWEM and 2 to 3 Target DONREs can assess loading capacity in each province, and VEA can assess it in the target river basins.	1) JET conducted ATC as mentioned above. Based on 53 of questionnaire results of ATC from all target DONREs, understanding on the knowledge and skills related to loading capacity assessment was improved, of which grade increased from level 2 to level 3 in five-grade evaluation generally. 2) Thai Nguyen DONRE Bac Ninh DONRE, Binh Duong DONRE and Dong Nai DONRE, 57% of 7 target DONREs, conducted the assessment of loading capacity including pollution load analysis in own river basin.	53 (58% of WG members) of C/Ps were recognized enhancing knowledge and skills related to loading capacity assessment. In addition, among 7 target provinces, 4 provinces conducted the assessment of loading capacity including pollution load analysis in own river basin. Therefore, it was considered that the indicator was achieved.
	2-4 More than 40% of target DONREs prepare the assessment of loading capacity in own river basin.	1) Thai Nguyen DONRE Bac Ninh DONRE, Binh Duong DONRE and Dong Nai DONRE, 57% of 7 target DONREs, conducted the assessment of loading capacity including pollution load analysis in own river basin.	Among 7 target provinces, 4 provinces (57%) conducted the assessment of loading capacity including pollution load analysis in own river basin. Therefore, it was considered that the indicator was achieved.
	2-5 Share the outputs obtained with concerned departments in MONRE/VEA and local DONREs in the target river basins	1) Pollution load analysis results, water quality simulation results, and river-basin WDSIs were shared among the target provinces in TF meeting in March 2017. 2) The outcomes of the Project were disseminated with the concerned DONREs including Nue Dye river basin in the workshop held in November 2018. 3) The training materials for the ATC was published by VEA, and distributed in 5th JCC meeting and the final workshop in April 2019.	As described as output, the Project outputs were share with not only target DONREs, but also other concerned DONREs. Therefore, it was considered that the indicator was achieved.

Source: JET

7.4 Internal Evaluation of Achievement of Output-3

Achievement of Output-3 is shown in Table 7-4. The Output-3 is that a road map for improvement of RBWEM is prepared based on the outcomes of Output-1 and Output-2, and MONRE/VEA is ready to implement further steps toward the Integrated River Basin Water Resource Management (IRBWRM). The indicators for evaluating achievement of this output are formulating and planning RBWEM mechanisms with the final draft legislative documents prepared under Output-1, and prepare a Road Map for IWRM. Through evaluatuion of the indicators, it was confirmed that the activities to formulated and planned RBWEM mechanism has been started, and the Road Map for IWRM was prepared and reported to MONRE and relevant stakeholders in 5th JCC and the final workshop.

Table 7-4 Internal Evaluation of Achievement of Output-3

Output-3	Indicator	Output	Evaluation
A road map for improvement of RBWEM is prepared based on the outcomes of Output-1 and Output-2, and MONRE/VEA is ready to implement further steps toward the Integrated River Basin Water Resource Management (IRBWRM).	3-1 More than 10 C/Ps receive technical training, more than 5 C/Ps are trained and obtained enough skills and knowledge for implementation of the road map.	1) JET held 3rd training course in Japan with 10 trainees from September to October 2018. 2) All of the trainees replied the questionnaire, and described their understanding on RBWEM, and necessity of IWRM. In addition, all trainees prepared the Action Plan for proceeding RBWEM in Vietnam, and documented as a report to VEA decision makers, and presented the key points in the workshop in November 2018.	10 of C/Ps participated the 3rd training in japan, and obtained skill and knowledge on RBWEM and road map for IWRM. Therefore, it was considered that indicator was achieved.
	3-2 MONRE/VEA takes initiative to coordinate necessary activities to prepare the Final Draft Circulars based on the draft Circulars developed in Output-1 receiving support by JET.	1) VEA summarized the legislative and other documents to be prepared through the Project, and confirmed in 4th JCC. Circular-76 and VEA Decision No.154, the final draft Guideline for Coordination Mechanism and Collecting and Information Sharing, and the final draft Decree including regulations on environmental compensation were reported in 5th JCC. Regarding the legalization process of the final draft Decree is being implemented.	The indicator was achieved. Due to change of important assumptions such as implementation of a new LEP revision process, legalization is continued in post-project phase. In case that the legalization process is continued after the Project, VEA needs to identify the schedule of legalization process in post project phase.
	3-3 Inter-provincial coordination models are proposed in Cau river basin and Dong Nai river basin.	1) Six times of TF meetings were held by DONREs in the pilot area in Cau river basin and Dong Nai – Saigon river basin in September 2016 and May 2018, respectively. Although RBOs were not been developed, the TF meetings are expected to be parent bodies for developing inter-provincial coordination models.	The indicator was achieved as initial phase for coordination for setting target by each province in an inter-provincial river basin. In future, the Government of Vietnam is expected to launch the organizations by conducting final process of approval for coordinating activities for RBM, such as RBOs.
	3-4 VEA develops the plans to manage RBWEM mechanism referring proposed draft legislative documents developed by the Project.	1) The approach for applying loading capacity assessment to RBWEM was discussed through preparation of Action Plan in Cau river basin and Dong Nai river basin. 2) An Action Plan and Overall Plan for river basin management was finalized, with reflecting the technical process	The indicator was achieved. VEA is expected to proceed the RBWEM activities wth the prepared Action Plan and Overall Plan.

Output-3	Indicator	Output	Evaluation
		proposed as legislative documents under Output-1. The final version of the Action Plan and Overall Plan was reported in 5th JCC and the final workshop.	
	3-5 Based on the Project results, MONRE/VEA develop and revise the road map.	1) Preparation work of the Road Map was finalized, discussing with PMU and DWRM. The final version of the Road Map was reported in 5th JCC and the final workshop.	The indicator was achieved.

Source: JET

7.5 Result of Capacity Assessment

7.5.1 Mid-term Capacity Assessment

(1) Mid-term Assessment related to BTC

Organized training program was implemented by collaboration from JET, Vietnamese experts, and support from VEA and target DONREs. The BTC was organized from September 2016 to May 2017, as shown in the table below, and totally 756 trainees were participated from VEA and 7 target provinces.

Table 7-5 Training Program of BTC

Code	Purpose and Contents	Duration
BTC-1-1	Water quality standard and monitoring	August to September 2016
BTC-1-2	Planning and implementation of WDSI	September 2016 to March 2017
BTC-1-3	Delineation of watershed, "Rainfall-runoff" analysis, and river water flow analysis	August to December 2016
BTC-1-4	Planning and implementation of environmental inspection and pollution source control	September to November 2016

Source: JET

At the end of BTC, questionnaire survey was conducted to the trainees to grasp trainees' ideas on training contents. The summarized results are shown in Figure 3-5 and Figure 3-6. In Cau river basin area, 86% of trainees of VEA and DONREs of Bac Giang, Bac Ninh, Thai Nguyen answered that training contents were somewhat new. In Dong Nai river basin, 73% of trainees from HCMC, Dong Nai, Binh Duong, BR-VT answered that training contents were somewhat new. On the other hand, 55% of trainees in Cau river basin and 50% of trainees in Dong Nai river basin replied that the training contents were useful for them. In addition, 63% of trainees in Cau river basin and 62% of trainees in Dong Nai river basin answered the training contents were supportive for their job. Based on the questionnaire results, JET considered that the BTC contents considering RBWEM included new contents for trainees, but it was not always supportive one for trainees' daily work focusing on not control river basin but control of each pollution sources. Based on the questionnaire results, JET considered that the further training program should make a bridge between their daily work and RBWEM, and make trainees understand that total pollution load control approach including pollution load analysis and loading capacity assessment are supportive tool for their regular work and regional wastewater discharge source control.

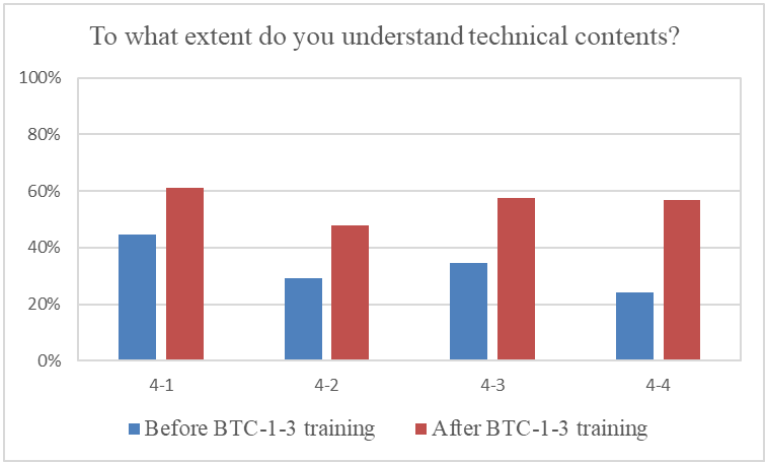
Note: Number of respondents is 54.
Source: JET

Figure 7-1 Feedback of Basic Training Course (BTC) from Northern DONREs (Cau River Basin)

Note: Number of respondents is 29.
Source: JET

Figure 7-2 Feedback of Basic Training Course (BTC) from Southern DONREs (Dong Nai River Basin)

Regarding technical content, a set of answers showed that the trainees comprehension on technical issues increased comparing before and after of the training. Figure 3-7 shows the example of difference of comprehension of training before and after BTC-1-3, “Delineation of watershed, "Rainfall-runoff" analysis, and river water flow analysis”. In the figure, blue bar chart shows comprehension level before the training, and brown bar chart shows comprehension level after the training. The figure shows that trainees recognized that their comprehension on runoff and river flow analysis, and watershed mapping by GIS were enhanced. Through the discussion with trainees, JET considered that trainees capacities were enhanced through BTC.



4-1- How do you understand water cycle before/after the training?

4-2- How do you understand runoff analysis before/after training?

4-3- How do you understand watershed mapping using GIS before/after training?

4-4- How do you understand river flow analysis in QUAL2K before/after training?

Note: Number of respondents is 61.
Source: JET

Figure 7-3 Evaluation of Technical Questions of Basic Training Course

(2) Development of ATC

The mid-term CA showed that the training contributed to increasing trainees capacity on knowledge for implementing RBWEM with total pollution load control approach, but still had limitations in skills on practical work such as calculation of total pollution load and loading capacity assessment for C/P. Many trainees requested to provide hands on training for technical

issues, and field visit, study tours to learn from other provinces. Considering the trainees opinions, the following framework for ATC was planned.

1. ATC was organized in different formats in Cau river basin and Dong Nai river basin:
   - Joint training for 3 north provinces: Bac Ninh, Bac Giang, and Thai Nguyen for WDSI application, and summary of pollution load analysis.
   - Additional training on MIKE 11 model construction for Dong Nai, Binh Duong, and HCMC.
2. Environmental awareness campaigns were organized in Bac Giang.
3. The project combined this objective to organize study tours for all target DONREs to visit Cau river basin, and Dong Nai river basin.

For developing training program of ATC, as for first step, the PPs' progress and interim results, such as WDSI with wastewater discharge source maps and discharged pollution load calculation results for the pilot project area of both river basins, were referred and reviewed. As next step, JET calculated that tentative loading capacity at the control point of the pilot project areas, and science-based allocation of calculated loading capacity to each province.

With using the outputs mentioned above, the ATC was planned and conducted. ATC comprises of lecture on total pollution load control in Japan (ATC-1-1), and a series of hands-on training on pollution load analysis, loading capacity assessment, and WDSI development (ATC-1-2-1, ATC-1-2-2, ATC-1-3). The ATC included the contents related to Output-3, such as finalizing the contents of final draft Circular-2 and 3, and Development of Action Plan for both river basins (ATC-2 and ATC-3).

The ATC was organized from May to September 2017, as shown in the table below, and totally 426 trainees were participated from VEA and 7 target provinces.

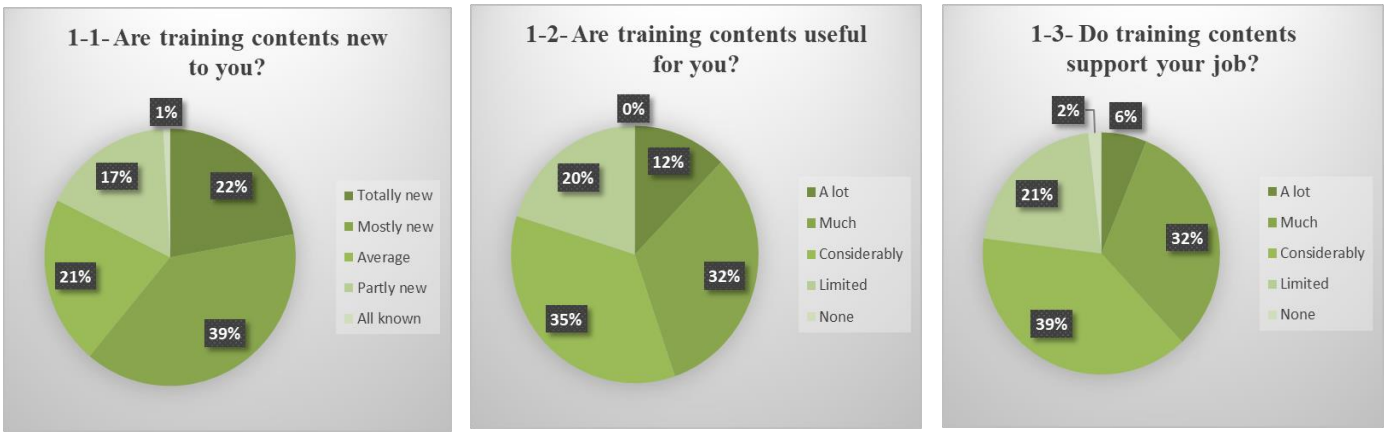
Table 7-6 Training Program of ATC

Code	Purpose and Contents	Duration
ATC-1-1	Lecture on total pollution load control approach in Japan	June 2017
ATC-1-2-1	Hands-on training on pollution load analysis and simulation models	May to August 2017
ATC-1-2-2	Hands-on training on loading capacity calculation	July to September 2017
ATC-1-3	Hands-on training on WDSI for wastewater discharge source control activity	June 2017
ATC-2	Finalizing the contents of final draft Circular-2, 3 (Conduct through TF and technical meeting)	June. 2017 - Dec 2017
ATC-3	Development of the Action Plan for both river basins (Conduct through TF and individual meeting)	Oct 2017 – Apr. 2019

Source: JET

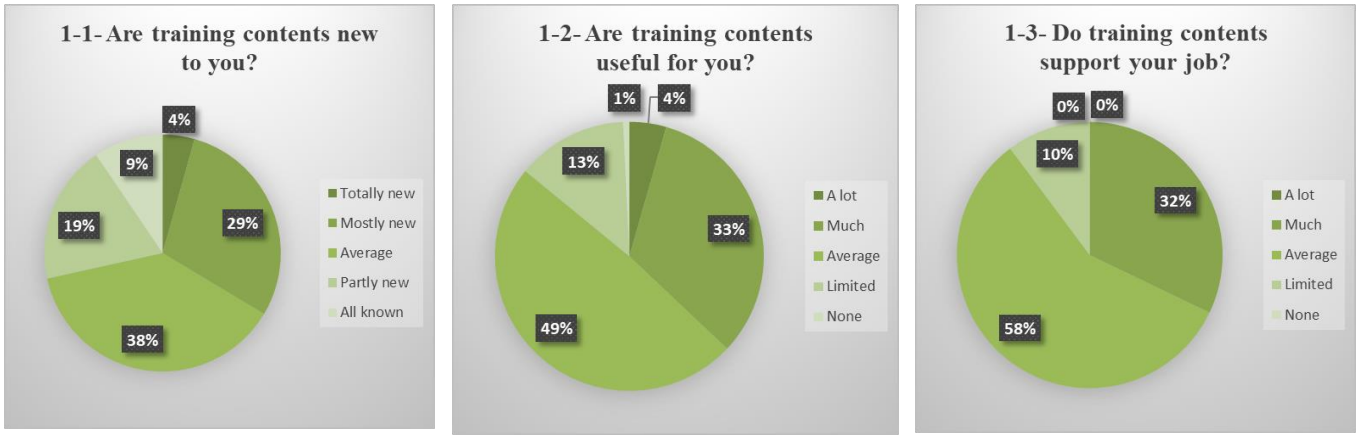
7.5.2 Final Capacity Assessment

A set of questionnaire survey was conducted at the end of ATC and the collected answers were analyzed. Feedback was positive about results of questionnaires after ATC. In Cau river basin, 99% of trainees answered the content was somewhat new for them, and 79% of trainees answered the training contents were useful. In addition, 77% of trainees answered that the training contents were supportive for their job. In Dong Nai river basin, 91% of trainees answered the content was somewhat new for them, and 86% of trainees answered the training contents were useful. In addition, 90% of trainees answered that the training contents were supportive for their job. As a result of questionnaire survey, even though the training content of ATC had new technical matters, but trainees considered that the contents trained, such as pollution load analysis and loading capacity assessment would be useful and supportive for their job for RBWEM.



Note: Number of respondents is 84.
Source: JET

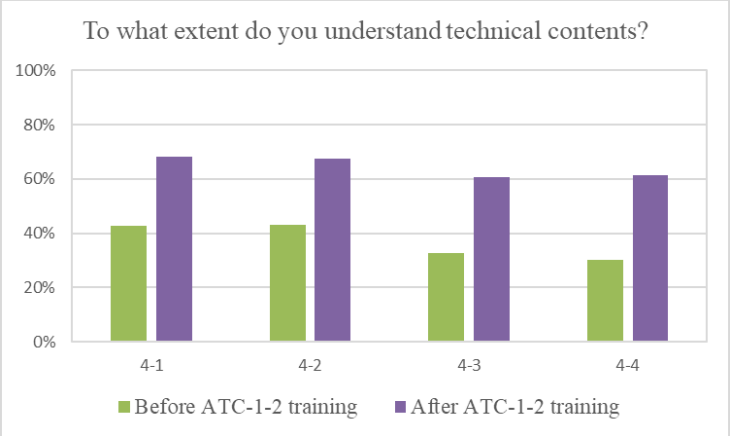
Figure 7-4 Feedback of ATC from Northern DONREs (Cau River Basin)



Note: Number of respondents is 71.
Source: JET

Figure 7-5 Feedback of ATC from Southern DONREs (Dong Nai River Basin)

Regarding technical content, a set of answers showed that the trainees comprehension on technical issues increased comparing before and after of the training. Figure 3-10 shows the example of difference of comprehension of training before and after ATC-1-2-1, “Hands-on training on pollution load analysis and simulation models " and ATC-1-2-2, “Hands-on training on loading capacity calculation” In the figure, green bar chart shows comprehension level before the training, and purple bar chart shows comprehension level after the training. The figure shows that the trainees recognized their knowledges on how to implement and summarize the result for pollution load analysis and water quality simulation were enhanced. After the training, Thai Nguyen DONRE, bac Ninh DONRE, Binh Duong DONRE and Dong Nai DONRE has started their trial work on pollution load analysis and loading capacity assessment in each province. Based on the results, JET considered that the ATC provided skills and knowledge for pollution load analysis and loading capacity assessment.



4-1- Which degree have you understood how to conduct pollution load analysis, before/after the training?

4-2 Which degree have you understood how to show results of pollution load analysis, before/after the training?

4-3 Which degree have you understood how to manipulate water quality simulation model when pollution sources changes, before/after the training?

4-4 Which degree have you understood how to show results of water quality simulation, before/after the training?

Note: Number of respondents is 53.
Source: JET

Figure 7-6 Evaluation of Technical Questions in Advanced Training Course

Final survey assessment showed positive outcome of the BTC and ATC, as well as effectiveness of the CD program of the project, while practical training for pollution load analysis and loading capacity assessment were provided based on the request of trainees provided in mid-term CA.

7.6 External Factors Affecting the Project Implementation

7.6.1 Movement on Revision of Basic Legal Framework and Relevant Activities in Vietnam

From 2018, the Government of Vietnam decided to revise the LEP that is the element forming basis of environmental management, including RBWEM in Vietnam. The revision of LEP has affected the progress of activities under Output-1 of the Project, such as legalization of Decree including the contents of environmental compensation. As of May 2019, MONRE plans to submit the draft LEP to National Assembly in November 2019. In accordance with the progress of revision of LEP, the legalization process concerning under the Project is expected to continue, If LEP is revised as sheduled.

Some other movement of the Vietnamese side also affected to the outcomes of the Project. At the beginning of 2018, the Prime Minister Decision 140, aiming at overall pollution source inventory, was enforced. Under the Decision, pollution source inventory is being developed for not only wastewater source, but also other sources including air and solid waste, so legalization of the circular focusing only for wastewater source inventory development was postponed. At the beginning of 2019, a new law named the Law on Planning was enforced, and national and regional planning framework in Vietnam including RBWEM planning was changed. It was inevitable that the legalizing work, such as the final draft Decree including environmental compensation prepared in the Project, is being affected by these kinds of movements, and some activities would be necessary in post project phase to use the project outcomes and experiences effectively, considering planning framework designated by the Law on Planning.

7.6.2 Delay of Establishment of RBO

As of July 2019, establishment of RBO has been proposed by MONRE to Prime Minister Office, but the decision has not been approved. For implementation of RBWEM, the organization in charge of setting goal and coordinating the concerned authorities of planning and implementing for RBWEM is essential, especially for inter-provincial rivers. MONRE is expected to explain requirement of RBOs for RBWEM to the Prime Minister Office to accelerate the process of approving the decision for establishing RBOs for main inter provincial rivers.

7.6.3 Lessons Learned Obtained through the Project

Lessons learned through Project activities are summarized from viewpoints of project management and technical aspects as follows. It will be helpful for another similar project implementation.

(1) Challenging Issues for Institutional Development of RBWEM

Through the Project, a lot of discussions were implemented in a series of task force meetings contributed to key issues for coordination for RBWEM, especially for inter-provincial rivers, such as process of coordination and items to be examined for obtaining consensus on pollution load allocation among the relevant provinces.

In Vietnam, for enforcing this matter, the River Basin Environmental Protection Committees have been established. They hold annual meeting for sharing information, setting target and monitoring each province’s activities. On the other hand, function’s and power of the committee are limited. To make it functional, it is recommended to integrate the roles of the committee and RBOs. However RBOs has not yet been established officially during the project phase, due to several external factors such as revising of national planning mechanism by enforcement of Law on Planning.

During the project period, importance and necessity of coordination were confirmed by both side, and requirement of policies for allocation of to guide for developing goals and targets for RBWEM were proposed from target DONREs to MONRE/VEA in the target river basin. It is necessary to consider arranging an institutional mechanism for RBWEM in post project phase.

(2) Enhancement of Technical Activities for Collecting and Sharing Data and Information Required for Scientific-based Total Pollution Load Control

The Project emphasizes importance of scientific-based information on pollution load and loading capacity to discuss required measures and obtain consensus for river basin planning by MONRE/VEA and DONREs. Through the PPs implemented in the Project, Vietnamese C/P and JET estimated generated/discharged pollution load, and loading capacity in Cau and Dong Nai river basin. However, uncertainty of the estimated results were often argued, and sometimes it makes it difficult to facilitate coordination mechanism based on the estimated results. One of the important reasons why the uncertainty was lack of reliable and available information for estimation of pollution load and loading capacity, such as insufficient water flow and quality data, or scattered wastewater discharge source information. These problems are due to insufficient comprehension on necessity of such data for RBWEM, or lack of required budget. Through the project activities, target DONREs' comprehensions on data and information required for RBWEM were enhanced by implementation of PPs. To proceed WERBM based on scientific-based information, systems to collect, store, and share required data and information with enough reliability needs to be enhanced in whole of Vietnam by MONRE/VEA and DONREs with using proposed tools, such as environmental information database planned by MONRE/VEA. In the Project, C/Ps understanding on necessity of reliable data and information for pollution load analysis and loading capacity assessment was improved by implementation of PPs. It is expected that this improvement will contribute to securing budget for colleting and sharing required reliable data among MONRE/VEA and DONREs, and increasing number of reliable data and information.

8. Recommendations for Achieving the Project Overall Goal

The Project has the following Overall Goal to accelerate the movement of RBWEM and IWRM in Vietnam. The Overall Goal is expected to be achieved by C/P themselves within 3 to 5 years after completion of the Project. This section proposes recommendations from institutional viewpoints and technical viewpoints, based on indicators with assessment of current RBMWEM in Vietnam.

Overall goal	Enforcement capacity of MONRE/VEA and DONREs is strengthened, and MONRE/VEA is ready to implement river basin water environmental management system other than the target river basin area.
Objectively Verifiable Indicators	1. MONRE/VEA institutionalizes RBWEM mechanism considering the Integrated River Basin Water Resource Management (IRBWRM). 2. MONRE/VEA share the policy regarding RBWEM mechanism among MONRE/VEA and relevant organizations. 3. Local Authorities in target river basin area explicitly state policy on RBWEM in their Socio-economic Development Plan (SDP). 4. MONRE/VEA designates other important river basins as next targets for further promotion of RBWEM in Vietnam.

8.1 Overview of River Basin Water Environmental Management in Vietnam

After enforcing of Decree 38/ND-CP on 2015, concept of river basin management has been disseminated and proceeded in Vietnam. LEP currently under revision will include articles on RBWEM, and the Law on Planning requests MONRE to internalize RBWEM into national planning process. During the Project, several regulations for implementing RBWEM based on the scientific information were legislated such as Circular-76 and VEA Decision No. 154. In this manner, institutional mechanism for RBWEM has been developed gradually. On the other hand, effective measures for implementing RBWEM needs to be developed furthermore to address issues such as development of institutional mechanism for coordination among the concerned organizations for RBWEM, and enhancement of required data and information collecting activities for scientific-based total pollution load control, proposed in Section 7.5.3.

In this section, recommendations to proceed RBWEM in Vietnam are summarized, referring to the indicators of Overall Goal in the latest PDM. Based on the verifiable indicators, institutionalization and sharing policy for RBWEM will be necessary. In addition, each province/city is expected to state RBWEM in their socio-economic development plan, and MONRE/VEA have to take action in important river basins in addition to the Project target area. For these activities, it is necessary to integrate and enhance institutional mechanism, and implement scientific analysis with enough amount of reliable data and information to provide target allowable discharged pollution load amount to PPC and MONRE/VEA.

Table 8-1 Recommended Activities to Achive Overall Goal

No.	Items	Current Status and Recommended Actions
1	Integration and enhancement of institutional mechanism for allocation of allowable discharged pollution load	RBOs has not established yet. The institutional mechanism for allocation of allowable discharged pollution load in river basin level and coordinating among the concerned provinces/cities needs to be developed by using existing mechanism such as River Basin Environmental Protection Committee or regional agreement in Dong Nai – Saigon river basin before launching RBOs, and RBOs themselves after their launcing.
2	Data and information management	Through the Project, understanding on necessity of scientific-based information was increased, based on the discussion in JCC meetings and TF meetings. In post project phase, it is necessary to enhance data and information management capacity.
3	Scientific analysis based on water quality model	The Project provided experiences on this matter, and Thai Nguyen, Bac Ninh and Dong Nai provinces has started loading capacity assessment. It is necessary

No.	Items	Current Status and Recommended Actions
		to enhance this action furthermore to enhance RBWEM.
4	Point source and non-point source analysis and development of WWDI	The Project provided experiences on this matter, and Thai Nguyen, Bac Ninh、Binh Duong and Dong Nai provinces have started pollution load analysis activities. It is necessary to enhance this action furthermore to enhance RBWEM.
5	Information sharing and coordination among relevant organizations	The national regulation for data and information sharing has been developed, but available information for estimation of pollution load and loading capacity, such as insufficient water flow and quality data, or scattered wastewater discharge source information, due to insufficient comprehension on necessity of such data for RBWEM, or lack of required budget. Information collecting and sharing activities need to be enhanced to have reliable data and information for pollution load analysis and loading capacity assessment by planning and collecting required data and information by cities/provinces, and sharing the collecting information under supervising by MONRE/VEA.
5	Collaboration with various sectors	For better RBWEM and IWRM, it is necessary to involve various organizations, but the mechanism for involving various organizations is still weak and have to be enhanced. Firstly, the existing issues such as necessity of institutional development on RBWEM and IWRM should be shared among MONRE/VEA and other ministries and local cities/provinces with effective tool such as environmental information database, which is planned to be developed by MONRE..

Source: JET

8.2 Recommendation of River Basin Environmental Management in Vietnam

In order to achieve each indicator, recommendation is propose based on assessment of the difficulties.

(1) Integration and Enforcement of the Institutional Mechanism

For better RBWEM and IWRM, it is necessary to involve various organizations, such as MONRE/VEA and DONREs but there is no clear implementation structure to share important policies on RBWEM among relevant organizations and implement joint activities among provinces in same river basin. As mentioned in Section 7.5.3, it was found that necessity of establishment of coordination bodies, and requirement of policies to guide for developing goals and targets for RBWEM in the target river basin such as RBOs.

The national strategies leading concerned stakeholders including local authorities needs to be shown and share clearly. For that, DWRM and VEA needs to cooperate closely to demarcate required actions to be done, and exchange information and experiences.

Some local authorities such as Thai Nguyen DONREM, Bac Ninh DONRE, Dong Nai DONRE and Binh Duong DONRE have already started trial activities for RBWEM. Such local authorities would be “front runners” of the RBWEM in Vietnam, and the experiences of such local authorities needs to be shared with others. MONRE/VEA is expected to collect information on advanced experiences of RBWEM, and provide opportunity for sharing them.

Institutionalization for RBWEM and IWRM needs to be implemented continuously, such as development of RBOs, or establishment of coordination mechanism instead of RBOs, considering newly enforced Law on Planning. The Government of Vietnam and MONRE are expected to clarify time schedule and keep it, with referring the proposed in the Overall Plan and the Road Map of the Project. The concrete activities proposed in the Overall Plan and Road Map are shown in Table 8-2.

Table 8-2 Proposed Activiy to Achive Overall Goal of the Project (Institutional Aspect)

Outcomes	Actor	Timing	Outline of Action
Development of RBOs or substitute coordination mechanism for RBWEM	MONRE（DWRM, VEA）	As soon as possible in post project phase	As mentioned in the Overall Plan, it is essential to establish organizations having coordinating function for RBWEM. It is expected to establish RBOs which was proposed from 2016, and is being examined its establishing at Prime Minister Office. However, in case to delay of its establishment, existing institutional framework such as River Basin Environmental Protection Committee needs to be utilized as substitute mechanism with taking opportunities for discussing on RBWEM among relevant organizations such as PPC, MARD and MOIT by holding workshops. In Dong Nai river basin, each city/province make agreement for implementing RBWEM, and this agreement would be functioned for coordination for allocation of allowable discharged pollution load.
Development of IWRM master plan targeting 2030 with vision to 2050	MONRE（DWRM, VEA）	2025	As mentioned in the Road Map, it will be required to develop an IWRM master plan for targeting 2030, considering Law on Water Resource and LEP being amended.

Source: JET

(2) Implementation of Required Actions for Scientific-based Total Pollution Load Control Approach

Vietnamese relevant organizations said that this cause is due to insufficient data and information for estimating pollution load and loading capacity. But, these data assessment and setting should be conducted gradually. Even if some assessment data would have some uncertainty, for enhancing the river basin management, all stakeholder should understand this restriction, and commence pollution load analysis and loading capacity assessment to apply scientific-based information for RBWEM. In accordance with conducting pollution load analysis and loading capacity assessment, understanding on required data and information will be increased, and actions for obtaining reliable data and information would be taken. Through examinations of data collection and assessment activities, the reliability will be improved.

The capacity for collecting and sharing required data and information should be developed continuously. Based on these scientific analysis and assessment data, it is easier to take consensus among relevant stakeholders. For developing RBWEM, required actions such as ones described in the Overall Plan, prepared by the Project, should be considered by MONRE/VEA and the target DONREs.

Through the Project, Vietnamese C/P and JET examined on RBWEM with scientific information such as examination of generated/discharged pollution load and tentative loading capacity in Cau river basin and Don Nai river basin with 7 relevant provinces. These experiences become as good practice to develop the capacity for arranging required data and information in Vietnam. It is expected that both national and local C/Ps participating in the Project will taking up a role to take actions for arranging required data and information, and share their experiences obtained in the Project, and lead RBWEM in Vietnam. The concrete activity proposed in the Overall Plan is shown in Table 8-2.

Table 8-3 Proposed Activiy to Achive Overall Goal of the Project (Technical Aspect)

Outcomes	Actor	Timing	Outline of Action
Implementation of pollution load analysis and loading capacity assessment in river basin level based on Circular-76	MONRE（DWRM, VEA）, DONREs	As soon as possible in post project phase	As mentioned in the Overall Plan, data and information management for pollution load analysis and loading capacity development need to be enhanced with development of WDSI based on the Decision 140. For this activity, the following Project outcomes can be used. - For enhancing information management system, the Guideline for Information Collecting and Sharing prepared under Output-1 of the Project can be used. - For calculation of loading capacity, the VEA Decision No.154 on Guidelines for Loading Capacity Assessment prepared by the Project can be referred. - For developing WDSI, the Technical Manual on WDSI can be used. - For training on pollution load analysis and loading capacity assessment, VEA publishing booklet on training manual prepared by the Project can be used.

Source: JET