Department of Water Resources and Irrigation
Ministry of Energy, Water Resources and Irrigation
Government of Nepal

Project for the Promotion of Irrigated Agriculture in Terai Plain (Phase-2)

Project Completion Report

Main Report

February 2025

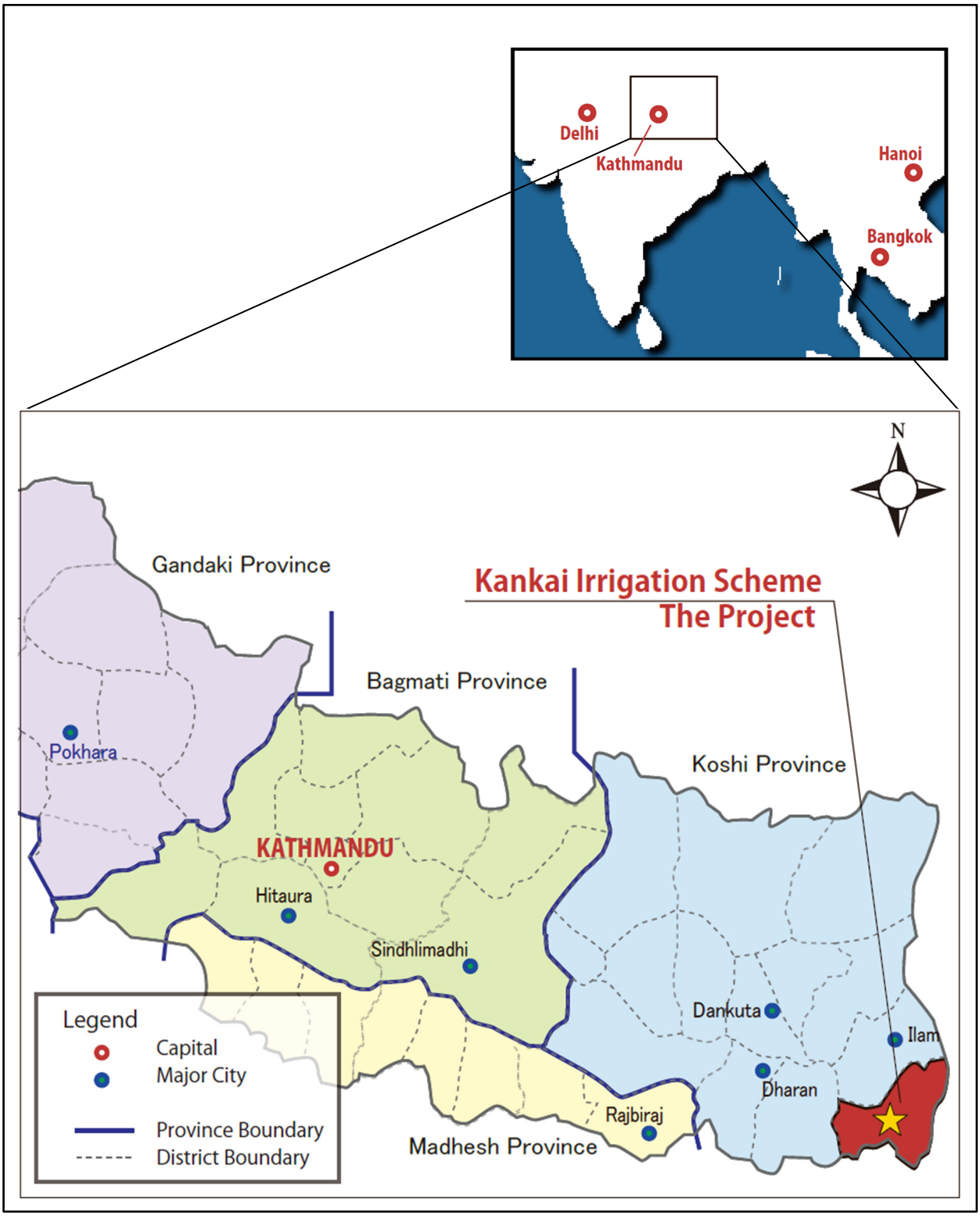
Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.
Sanyu Consultants Inc.

ED
JR
25-026

PROJECT FOR THE PROMOTION OF IRRIGATED AGRICULTURE IN TERAI PLAIN

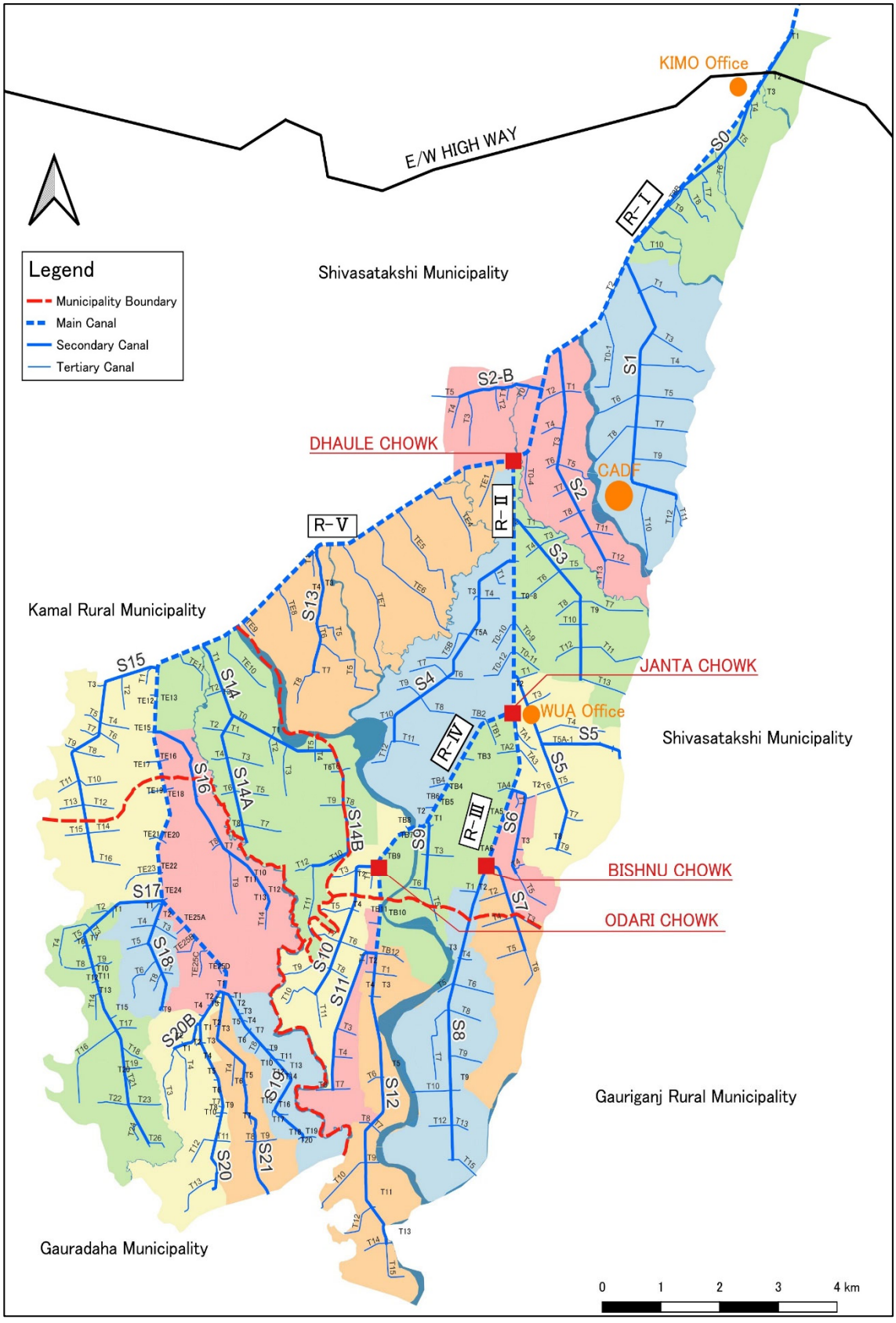
PROJECT LOCATION MAP



Source: JICA Project Team

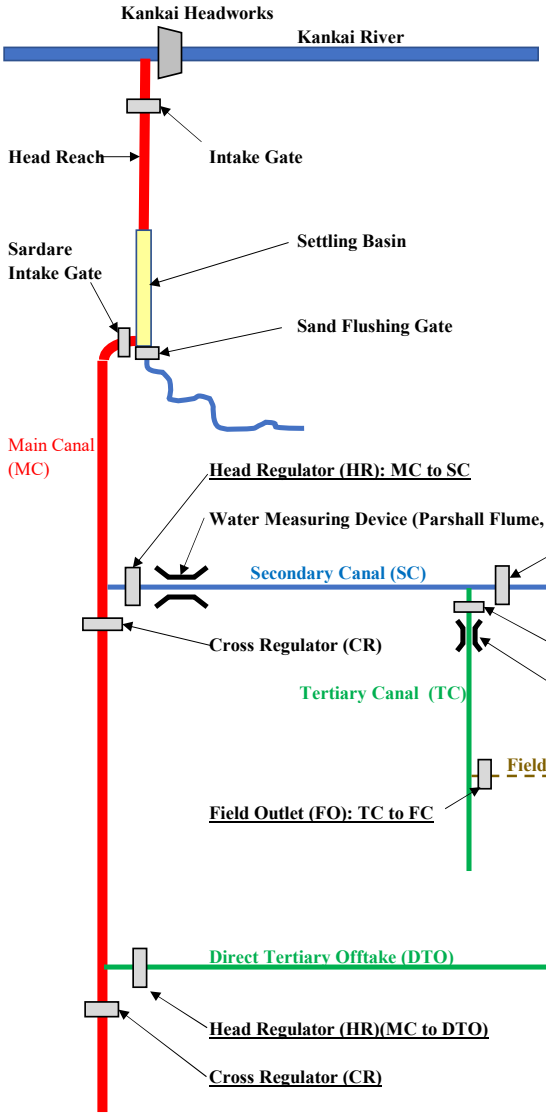
PROJECT FOR THE PROMOTION OF IRRIGATED AGRICULTURE IN TERAI PLAIN

KANKAI IRRIGATION SCHEME LAYOUT MAP



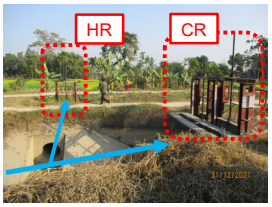
Source: JICA Project Team

Schematic Irrigation System and Name of Irrigation Facility

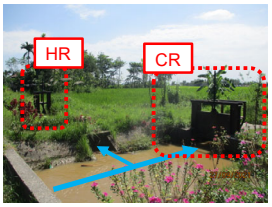


Intake at Headworks

Sardare Intake



CR and HR from MC to SC



CR and HR from SC to TC

Field Outlet from TC to FC

Division Box from FC to FC

Parshall Flume at BP of SC

Structure Name & Abbreviation

Structure Name	Abbreviation
Headworks	HW
Main Canal	MC
Secondary Canal	SC
Tertiary Canal	TC
Direct Tertiary Offtake	DTO
Field Channel	FC
Head Regulator	HR
Cross Regulator	CR
Field Outlet	FO
Division Box	DB
Parshall Flume	PF

Photographs for Overall Activities (Activity 1 – 9, 29 - 38)

Handing Over Ceremony for Procured Equipment from JICA Nepal Office to KIMO/WUA (Jun. 2022)

Japan Visit Training (Aug. 2023)

10th PMC Meeting at DWRI (Jun. 2024)

20th Task Team Meeting at Gauradaha Municipality (Jul. 2024)

Endline Survey (Aug. 2024)

Terminal Evaluation Mission (Sept. 2024)

6th JCC Meeting (Jan. 2025)

Project achievement Sharing Seminar (Jan. 2025)

Source: JICA Project Team

Photographs for Output 2 Activities
Improvement of Water Distribution Planning and Its Implementation (Activity 10 – 16, 39)

Command Area Updating
Field Verification with WUA Members (Feb. 2022)

Calibration of Water Measurement Device (Jun. 2022)

Training to KIMO Gate Keeper on Water Distribution for Spring Season (Mar. 2024)

Interview Survey to KIMO Gate Operators on Improvement of Water Distribution (Aug. 2024)

Experience sharing of irrigation activities by SCC-17 Chairman (Jun. 2024)

Construction of Water Measuring Device (Parshall Flume) (Jun. 2022)

Instruction to KIMO Staff of Method for Water Distribution Monitoring (Jul. 2022)

Water Distribution Management from MC to SCs by KIMO's Gate Operator (Sept. 2022)

Source: JICA Project Team

Photographs for Output 2 Activities
Implementation of Appropriate Facility Maintenance (Activity 17 – 22, 39)


Walk Through Survey & Functional Diagnosis
(Feb. 2022)


Maintenance Plan Preparation for TC / DTO
(May 2024)


Preparation of Maintenance Plan
(Nay, 2024)


Canal Cleaning (Jun. 2023)


Preparation of Master List of WUA Member
(ISF Payers) (Jan. 2023)


Workshop on ISF Collection System
(Jan. 2024)


Repair Works by KIMO's Budget
Headworks


Repair Works by KIMO's Budget
Main Canal

Source: JICA Project Team

Photographs for Output 2 Activities
Implementation of Appropriate Facility Maintenance (Activity 23 – 24, 39)

On Farm Development in 1st Model Site (SC-1, TC-6) (2022)

On Farm Development in 1st Model Site (SC-17, TC-2) (2022)

On Farm Development in 1st Model Site (SC-10, TC-10) (Jan. 2022)

On Farm Development in 2nd Model Site (SC-4, TC-11&12) (Jan. 2022)

Field Channel Construction by WUA (2023)

Water Intake from Field Channel to Farm Plot (2023)

Canal Cleaning by WUA using Procured Mini backhoe (Jun. 2022)

Demonstration of Land Levelling at Demo Farm in SC-4 using Procured Tractor and Laser Land Leveller (Feb. 2023)

Source: JICA Project Team

Photographs for Output 3 Activities (Activity 25 – 27, 40 - 42)

Monsoon Rice Seedlings Nursery in Gauradaha
(Jul. 2024)

Rapid Recovery of Rice Seedlings in Plastic Trays
(Mar.2024)

Monsoon Rice Transplanting in Gauriganj (SC-10)
(Jul. 2024)

Monsoon Paddy Cultivation
(Sep. 2024)

Coaching on Cucurbit Seedlings Gauradaha
(Jun.2023)

Site Visit to SRC-CAP Sites
(Nov. 2022)

Market Survey by Women's Group
(2nd Model Site) (Dec. 2022)

Stakeholder Forum on Winter Farming
(Aug. 2024)

Source: JICA Project Team

Photographs for Output 3 Activities (Activity 25 – 27, 40 - 42)

Coaching on Chili Seedlings
(Jun. 2023)

New Technology Demonstration of Plastic House Installation at SC-1 with support from AKC
(Jan. 2023)

Monsoon Vegetables Cultivation Under the Plastic Houses (Sep.2024)

Rice Straw Mulch Trial – Plant Residue Mulch
(Apr. 2024)

Stakeholder Forum on Winter Farming
(Aug. 2024)

Weeding a Carrot Field in Gauradaha
(SC-17) (Jan. 2024)

Vegetable Fields in Gauradaha
(SC-20) (Mar. 2024)

Cabbage Cultivation in Winter Season using Mulching Sheet at SC-1 (1st Model Site) (Jan. 2023)

Source: JICA Project Team

Photographs for Output 4 Activities (Activity 28, 43 - 46)

3 days Training on promotion of irrigated agriculture
Joint site visit to Kankai Headworks (Sep. 2024)

3 days Training on promotion of irrigated agriculture
Experience sharing by model farmers of vegetable production through CAP approach (Sep. 2024)

1 day dissemination workshop
Opening Session facilitated by Chief of KIMO at Meeting Hall of Shivasatakshi (Sep. 2024)

1 day dissemination workshop
Joint field visit to demonstration farm of rice transplanter for monsoon rice (Sep. 2024)

Presentation by WUA President of about Irrigation Scheme and Issues and Challenges (Dec. 2024)

Guidance on Preparation of Three-Years Action Plan to Agriculture Officer of Gauradaha (Dec. 2024)

Increase of Spring Rice Cultivation in 2024

Improvement of Water Distribution for Spring Season

Source: JICA Project Team

Project for the Promotion of Irrigated Agriculture in Terai Plain, Phase-2

Project Completion Report

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4.4 Minutes of 4th JCC Meeting on 21st April 2023
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Abbreviations

ABPSTC	Agribusiness Promotion Support and Training Centre
ACS	Activity Cooperation System
ADB	Asian Development Bank
ADS	Agriculture Development Strategy
AKC	Agriculture Knowledge Centre
CADF	Chandradangi Agriculture Development Farm
CAP	Commercial Agriculture Promotion
CHSC	Custom Hiring Service Center
CMIS	Chanda Mohana Irrigation Scheme
CNIS	Chandra Nahar Irrigation Scheme
C/P	Counterpart
DAC	Development Assistance Committee
DDG	Deputy Director General
DG	Director General
DOA	Department of Agriculture
DTO	Direct Tertiary Offtake
DTOC	Direct Tertiary Offtake Committees
DWRI	Department of Water Resources and Irrigation
FC	Field Channel/Canal
FG	Farmer's Group
GDP	Gross Domestic Product
GOJ	Government of Japan
GON	Government of Nepal
HH	Household
H-Q curve	Height-Quantity curve
IFL	Irrigation Facility Ledger
IMD	Irrigation Management Division
IMO	Irrigation Management Office
IMP	Irrigation Master Plan
IMT	Irrigation Management Transfer
ISF	Irrigation Service Fee
IWRMP	Integrated Water Resources Management Project
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
JPT	JICA Project Team
JS	Joint Secretory
JT/JTA	Junior Technician / Junior Technical Assistant
KIMO	Kankai Irrigation Management Office
KIS	Kankai Irrigation Scheme
LG	Local Government
MAFF	Ministry of Agriculture, Forestry and Fisheries
MC	Main Canal
MCC	Main Canal Committee
MOA	Ministry of Agriculture, Koshi Province (Former Ministry of Land Management, Agriculture and Cooperatives, Province No.1, MOLMAC)
MOALD	Ministry of Agriculture and Livestock Development

MOEWRI	Ministry of Energy, Water Resources and Irrigation, Koshi Province
MOIAC	Ministry of Industry, Agriculture and Cooperatives
MOLMAC	Ministry of Land Management, Agriculture and Cooperatives
MOPID	Ministry of Public Infrastructure Development
MOU	Minute of Understanding
MOWSIE	Ministry of Water Supply, Irrigation and Energy, Koshi Province (Former Ministry of Public Infrastructure Development, MOPID)
NARC	National Agriculture Research Centre
NKC	Nepal Krishi Care
NMC	Nepal Multipurpose Cooperative
OFD	On Farm Development
O&M	Operation and Maintenance
OJT	On the Job Training
PD	Project Director
PDM	Project Design Matrix
PF	Partial Flume
PM	Project Manager
PMC	Project Monitoring Committee
R/D	Record of Discussion
SAO	Senior Association Organizer
SC	Secondary Canal
SCC	Secondary Canal Committee
SDG	Sustainable Development Goal
SFAC	Small Farmer Agriculture Cooperative
SFDC	Small Farmer Development Cooperative
SRC-CAP	Sindhuli Road Corridor Commercial Agriculture Promotion Project
STW	Shallow Tube Well
TC	Tertiary Canal
TCC	Tertiary Canal Committee
TCP-PIAT	Technical Cooperation Project for Promotion of Irrigated Agriculture in Terai
TOT	Training of Trainers
W/P	Work Plan
WTS	Walk Through Survey
WUA	Water Users Association

Measurement Units and Currency

Area	**Volume**
cm^2 = Square-centimetre(s) m^2 = Square-metre(s) km^2 = Square-kilometre(s) (1,000,000 m^2) in^2 = Square-inch(s) (645.16 mm^2) ft^2 = Square-feet (929.0304 cm^2) ha = Hectare(s) (10,000 m^2) acre = Acre(s) (4,046.8 m^2 or 0.40468 ha.)	cm^3 = Cubic-centimetre(s) m^3 = Cubic-metre(s) km^3 = Cubic- kilometre(s) in^3 = Cubic- inch(s) ft^3 = Cubic- feet L = Litre(s) (1,000 cm^3) MCM = Million Cubic Metre (s)
Length	**Weight**
mm = Millimetre(s) cm = Centimetre(s) m = Metre(s) km = Kilometre(s) (1,000 m) in = Inch(s) (25.4 mm) ft = Feet (30.48 cm)	g = Gram(s) kg = Kilogram(s) (1,000 gr.) ton = Metric Tonne(s) (1,000 kg)
Currency	**Time**
US$ = United State Dollar NPR = Nepalese Rupee	s = Second(s) min = Minute(s) (60 sec.) hr = Hour(s) (60 min.)
Exchange Rate (as of February 2025)	
(1) US$ 1.0 = JPY 154.401 (2) US$ 1.0 = NPR 136.741 (3) NPR 1.0 = JPY 1.12915	

CHAPTER 1 INTRODUCTION

1.1 General

This project completion report is prepared in accordance with R/D on "Project for the Promotion of Irrigated Agriculture in Terai Plain" (hereinafter referred to as "the Project") made on 6th February 2019 between the Ministry of Energy, Water Resources and Irrigation (MOEWRI), the Government of Nepal (GON) and Japan International Cooperation Agency (JICA), Minutes of Meeting for Amendment of the Record of Discussions made on 29th October 2020 and Minutes of Meeting for 2nd Amendment of the Record of Discussions made on 6th May 2024. R/D and Minutes of Meeting for the amendments are presented in Attachment 3.1 to 3.3, respectively.

1.2 Background

(1) Present Conditions of Irrigation and Agriculture in Nepal

In Nepal, agriculture is a key economic sector that engages about 62% of the total population and accounts for about 24.09% of the Gross Domestic Product (GDP)[1]. Out of Nepal's of 29.16 million population, 20.23%[2] or almost 6 million are poor, of which 33.8% live in rural areas. The incidence of poverty is higher in rural areas (24.66%) than urban areas (18.34%). Agricultural and rural development has a great role to play in terms of economic development, poverty reduction and domestic disparity correction in Nepal[3]. It is approximately 68% of the farmers in Nepal produced solely for domestic consumption, while 1.1%, 24.7% and 5.4% produced solely for sale, mainly for domestic consumption and some sale, and mainly for sale and some for the domestic consumption, respectively[4]. This reveals that Nepalese agriculture is predominantly subsistence.

The Terai Plain (elevation 60 m to 300 m), which stretches from east to west on the plains of southern Nepal, is Nepal's breadbasket that is blessed with fertile soil and rich water resources and occupies 53% of the total cultivated area and 81% of the total irrigated area of 1.473 million ha. Rice, maize, wheat, vegetables, etc. are produced under rain-fed conditions or irrigation. The share of cereals, cash crops and vegetables in the national production is high, which is 45.0%, 15.2%, and 17.4%, respectively[1]. Improving productivity in the Terai Plain will greatly enhance domestic food security, as the region's agricultural products in the Terai Plain are distributed to the northern hills.

The GON has promoted irrigation development for over 50 years in different parts of the country with the support of development partners, including Irrigation Management Transfer (IMT) to improve operation and maintenance (O&M) of irrigation facilities. The GON expects water users associations (WUA) to play a key role in the IMT. Despite these efforts, significant outcomes have yet to be realized. Consequently, strengthening WUA's management capacity government support agencies has become an important issue in Nepal.[5]

[1] Economic Survey 2023/2024, Ministry of Finance, the Government of Nepal
[2] National Living Standard Survey 2022-23, National Statistics Office,2024. This data is based on the new poverty line computed by NLSS IV, which is NRs 72,908.00
[3] International Labour Organization 2019
[4] National Sample Census of Agriculture 2021/22, National Statistics Office Government of Nepal
[5] Fifteenth Plan (2019/20-2023/24), National Planning Commission, the Government of Nepal

(2) Background of the Request for the Project

For the above reasons, the GON has requested the government of Japan (GOJ) to implement the Project in Kankai Irrigation System, which aims to strengthen the O&M capacity of irrigation facilities in the Terai Plain.


Main Canal (Reach III) of Kankai Irrigation System, Jhapa District, Koshi Province

The Project period is divided into two phases. The Phase-1 activities were carried out from March 2019 to February 2020 and a draft action plan was formulated by the consensus of local stakeholders, and nine (9) mini projects were implemented according to the plan. Finally, the action plan was modified based on the activity results. After that, JICA conducted a remote detailed planning survey from August to September 2020 and reviewed the framework and Project Design Matrix (PDM) of the Project through discussions with the relevant officials of GON. The activities of the Phase-2 for the Project are to support the local stakeholders in the promotion of irrigated agriculture based on the action plan formulated in the Phase-1.

1.3 Objective of the Project

The Project aims to form "the Model of Irrigated Agriculture" by the collaboration among the Federal, Provincial, Local Governments and WUAs.

The concept of "the Model of Irrigated Agriculture" consists of the following four (4) components:

i) Improvement of water distribution planning and its implementation by the collaboration between the GON and WUAs;
ii) Improvement of implementation of appropriate facility maintenance by the collaboration between the GON and WUAs;
iii) Construction of field channel etc. by the collaboration between the GON and WUAs; and
iv) Improvement of farming (market-oriented agriculture) by the collaboration between Provincial Government, Local Governments and WUAs for increasing farmers' income and strengthening WUAs by the increase of farmers' motivation.

1.4 Outline of the Project

The outlines of the Project are as shown in the table below:

Table 1.4-1 Outlines of the Project

(1) Overall Goal	The Model developed by the Project is practiced in Terai Irrigation Area.
(2) Project Purpose	The Model of Irrigated Agriculture is formed by the collaboration among the Federal, Provincial, Local Governments and WUAs.
(3) Expected Outputs	**Output 1***: The issues regarding the Irrigated Agriculture in Kankai Irrigation Scheme (KIS) are analysed and shared by the stakeholders themselves, and the Action Plans for solution to the issues are formulated. **Output 2**: Equitable and efficient water distribution system is established by the improvement of water distribution planning and its implementation, appropriate O&M of facilities and construction of field channels, etc. **Output 3**: The incomes of farmers in target scheme are increased through the practice of market-oriented agriculture **Output 4**: The Activity Execution Cooperation System for improvement of irrigated agriculture among stakeholders of KIS is established, and the results of the cooperation activities are diffused to other irrigation schemes in Terai area through the trainings. **: Output 1 has been achieved in the Phase-1, and Outputs 2 to 4 correspond to the activities in the Phase-2.*
(4) Target Area	KIS (Beneficiary Farmers: 9,200 Household (HH), Irrigation Command Area: 8,951 ha) in Jhapa

	District in Koshi Province i) The activities for Output 2 will be implemented in the whole KIS. ii) The activities for Output 3 will be implemented in the selected Model SCC (Secondary Canal Committee) per each municipality area.
(5) Implementation Agencies (Counterpart (C/P))	i) Department of Water Resources and Irrigation (DWRI) and MOEWRI ii) Kankai Irrigation Management Office (KIMO) and Ministry of Water Supply, Irrigation and Energy (MOWSIE) of Koshi Province iii) WUA iv) 4 Municipalities (Shivasatakshi, Gauradaha, Gaurigunj, Kamal) v) Department of Agriculture (DOA) under Ministry of Agriculture and Livestock Development (MOALD)
(6) Cooperation Agencies	i) Ministry of Industry, Agriculture and Cooperatives (MOIAC) of Koshi Province ii) Agriculture Knowledge Centre (AKC), Jhapa District iii) Agribusiness Promotion Support and Training Centre (ABPSTC))
(7) Project Period	Total Project period: March 2019 to March 2025 (73 months) The Phase-1: March 2019 to February 2020 (completed) **The Phase-2: April 2021 to March 2025 (48 months)** **Stage-1: April 2021 to February 2023** **Stage-2: March 2023 to March 2025**

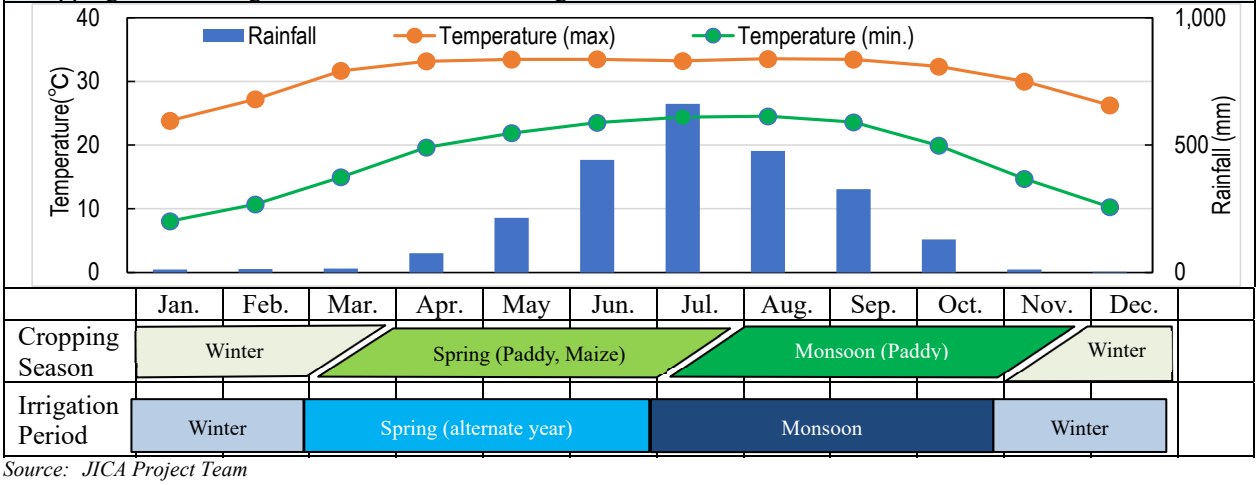
Source: JICA Project Team

1.5 Project Site

The general features of KIS, which is the Project site, are summarized as below:

Table 1.5-1 General Features of KIS

Item	Features
Scheme	Kankai Irrigation Scheme
Water Resource/River Discharge	Kankai River / Maximum River Discharge: 5,600 m^3/s, Minimum Discharge:7.74 m^3/s
Construction Period	Phase-1 area: 1971 to 1981, financed by Asian Development Bank (ADB) loan Phase-2 area: 1980 to 1991, financed by ADB loan
Major Irrigation Facilities	▪ Kankai Headworks: 1 Nos. ▪ Main Canal: 36 km ▪ Secondary Canal: 74 km（22 Nos.） ▪ Tertiary Canals: 130 km（354 Nos.）
Irrigation Area	Original: 7,000 ha（Phase-1 Area: 5,000 ha, Phase-2 Area: 2,000 ha） Updated: 8,951 ha based on the Project Activities
Responsible Organization for O&M	KIMO and WUA
Organization of WUA	Main Canal Committee (MCC), Secondary Canal Committee（SCC）, Tertiary Canal Committee（TCC）
Cropping Season, Irrigation Period and Meteorological Condition in KIS	



Source: JICA Project Team

1.6 Implementation Structure of the Project

1.6.1 Implementation Structure

The following government officials are assigned for the Project:

Table 1.6-1 Assignment of the Government Officials

Assignment	Officials	Task
Project Director (PD)	The Deputy Director General (DDG), Irrigation Management Division (IMD), DWRI, MOEWRI	Overall responsibilities for administration and implementation of the Project
Project Manager (PM)	Chief of KIMO	Responsibility for the Project activities in KIS
C/P Personnel	Staffs from KIMO, Staff from AKC, Jhapa 4 Municipalities WUA members	Implementation of the Project activities in KIS

Source: prepared by JICA Project Team based on R/D

A Joint Coordination Committee (JCC), Project Monitoring Committee (PMC) and Task Team have been established for smooth implementation and administration of the Project. The members of JCC, PMC and Task Team and their roles and responsibilities are as follows:

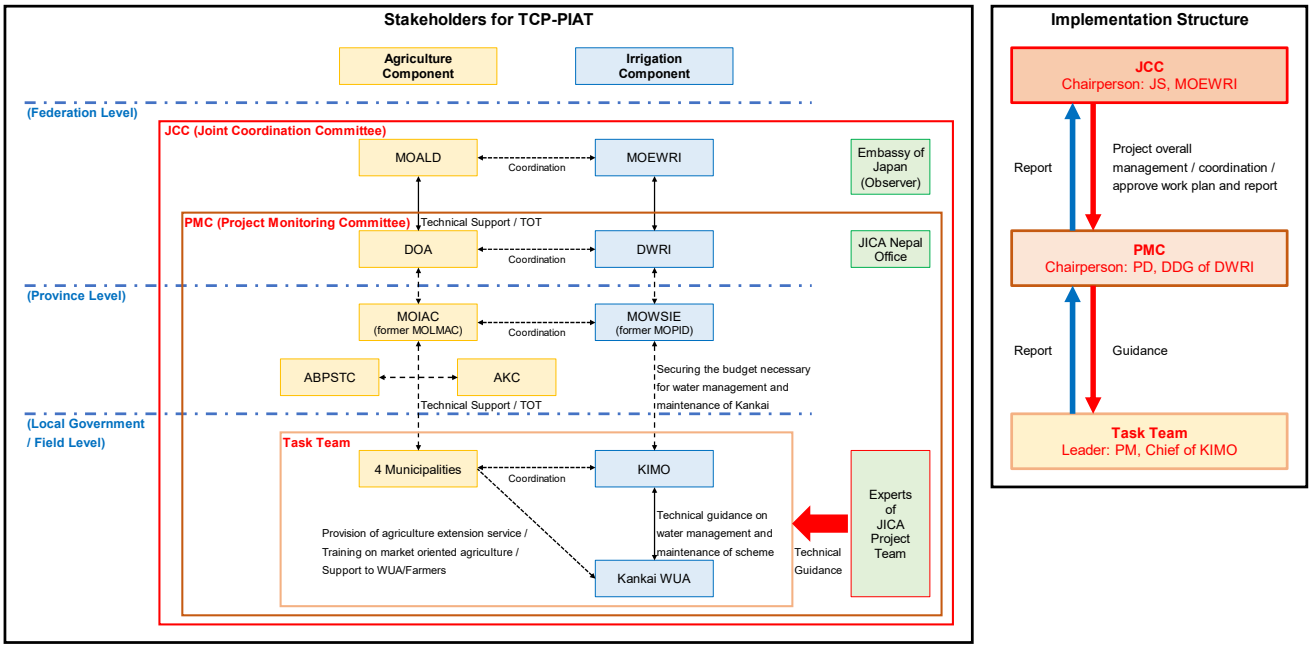
Table 1.6-2 Implementation Structure of the Project

Organization	Members	Roles
JCC **The meeting of JCC was held every 6 months in Stage-1 and one time per year in Stage-2*	**<Nepalese Side>** ▪ Joint Secretary of Water Resources Division, MOEWRI (Chairperson) ▪ DG: Director General, DWRI ▪ PD: DDG of IMD, DWRI ▪ PM: Chief of KIMO ▪ Representatives of MOALD ▪ Representatives of DOA, MOALD ▪ Representatives of MOWSIE (former Ministry of Public Infrastructure Development (MOPID)), Koshi Province ▪ Representatives of MOIAC (former Ministry of Land Management, Agriculture and Cooperatives (MOLMAC)), Koshi Province ▪ Representatives of 4 Municipalities ▪ Representatives of WUA **<Japanese Side>** ▪ Representatives of JICA Nepal Office ▪ JICA Project Team ▪ Representative of Japanese Embassy (Observer)	▪ To approve the annual work plan (W/P) and progress/monitoring reports received from PMC ▪ To examine and exchange opinions on major issues in connection with the Project arising from PMC and to recommend appropriate measures ▪ To discuss any other issues pertinent to the smooth implementation of the Project
PMC **The meeting of PMC was held quarterly basis.*	**<Nepalese Side>** ▪ PD: DDG of IMD, DWRI (Chairperson) ▪ PM: Chief of KIMO ▪ Representatives of DWRI ▪ Representatives of DOA, MOALD ▪ Representatives of MOWSIE (former MOPID), Koshi Province ▪ Representatives of MOIAC (former MOLMAC), Koshi Province	▪ To monitor the Project activities quarterly in accordance with the Action Plans ▪ To discuss the issues of the Project activities and countermeasures for a solution of the issues ▪ To examine annual activity plan and submission of the plan to JCC ▪ To examine and exchange opinions on major issues in connection with the Project

Organization	Members	Roles
	▪ Representatives of AKC and ABPSTC, Provincial Govt. No.1 ▪ Representatives of 4 Municipalities ▪ Representatives of WUAs **<Japanese Side>** ▪ Representatives of JICA Nepal Office ▪ JICA Project Team	arising from PMC and to recommend appropriate measures ▪ To discuss any other issues pertinent to the smooth implementation of the Project
Project Task Team	▪ PM: Chief of KIMO (Leader) ▪ Staffs of KIMO ▪ Focal Person of agriculture section of 4 Municipalities ▪ Representatives of WUA (Focal Person)	▪ To formulate yearly activity plan ▪ To implement and monitor the activities ▪ To prepare activity progress reports and monitoring reports and submission of the reports to PMC ▪ To examine countermeasures on the issues related to activities

Source: prepared by JICA Project Team based on R/D

The Project implementation structure is summarized in the following figure and the list of the counterpart as of end of January 2025 is presented in Attachment 1.1.



Source: JICA Project Team

Figure 1.6-1 Implementation Structure

1.6.2 Roles and Responsibilities of the Stakeholders for Implementation of the Project

In the first and forth JCC meetings, the roles and responsibilities of each stakeholder in the Project were confirmed as shown in the following table:

Table 1.6-3 Roles and Responsibilities of Stakeholders

Organization		Roles	Responsibilities
Federal Level	MOEWRI / DWRI	Develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation schemes in Terai	1) To organize JCC Meeting every 6 months by Joint Secretary of MOEWRI (Chairperson) 2) To organize the PMC Meeting quarterly basis by DDG of IMD of DWRI (PMC Chairperson) 3) To approve the W/P. 4) To approve the guidelines for Irrigated Agriculture Model. 5) To coordinate with all stakeholders related to the Project

Organization		Roles	Responsibilities
		Area	6) To scale up the Project outputs and the guidelines to stakeholders of other irrigation schemes in Terai Plain 7) To nominate officers for the Project trainings and C/P trainings in Japan. 8) To evaluate the Project performance. 9) To disseminate the Project activities and outputs.
	MOALD / DOA	Contribute to develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation schemes in Terai Area	1) To support to implement the activities based on the W/P. 2) To participate in JCC and PMC. 3) To contribute to finalize and approve the guidelines for Irrigated Agriculture Model. 4) To disseminate the Project outputs and the guidelines to stakeholders of other irrigation schemes in Terai Area 5) To nominate officers for the Project trainings and C/P trainings in Japan. 6) To evaluate the Project performance. 7) To expand Commercial Agriculture Promotion (CAP) approach. 8) To support to organize the Trainings of Trainers (TOT) on CAP approach by providing CAP trainers (resource person)
Province Level	MOWSIE (former MOPID)	Contribute to develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation schemes in Terai Area in Province No.1	1) To support KIMO and WUA for implementation of TCP-PIAT by ensuring necessary counterpart funding budget 2) To assist KIMO to maintain / rehabilitate / expand / develop KIS. 3) To monitor and evaluate the performance of KIMO in relation to TCP-PIAT. 4) To assist for coordination with other stakeholders in Province including Ministry of Agriculture, Koshi Province (MOA). 5) To nominate officers for the Project trainings and C/P trainings in Japan.
	MOIAC (former MOLMAC, MOA)	Contribute to develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation schemes in Terai Area in Province No.1	1) To support AKC and Local Government for implementation of TCP-PIAT by ensuring necessary counterpart funding budget 2) To monitor and evaluate the performance of AKC in relation to TCP-PIAT 3) To coordinate with other stakeholders in Province including MOWSIE 4) To nominate officers for the Project trainings and C/P trainings in Japan. 5) To expand CAP approach to local government (LG) in collaboration with KIMO and WUA in accordance with CAP guidelines 6) To support to organize the TOT on CAP approach by providing CAP trainers (resource person)
	AKC	Contribute to develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation schemes in Jhapa District	1) To support agriculture production for farmers in in KIS command area by Increasing access to modern agricultural technologies and reliable agricultural extension and complementary services 2) To support to create a platform for interactions among farmers, processors and market agents. 3) To enhance farmers' capacity to understand and act based on market signals and demands. 4) To support to organize the TOT on CAP approach by providing CAP trainers (resource person / SMS)
	ABPSTC	Contribute to develop Irrigated Agriculture Model in KIS	1) To provide trainings to farmers and other stakeholders on CAP approach 2) To visit KIS area to oversee implementation of CAP approach by farmers and coordinate with local level and advise KIMO / WUA / AKC / JICA Project Team

Organization		Roles	Responsibilities
Local Level	Task Team: KIMO	Develop Irrigated Agriculture Model in KIS	1) To implement O&M of Kankai headworks and main canal system 2) To coordinate the government agencies and WUA at local level. 3) To prepare water distribution plan based on water requirement in KIS 4) To distribute water from Main Canal to Secondary Canal by gate operator 5) To install / repair / calibrate water measuring devices 6) To monitor and evaluate implementation the water distribution plan with WUA 7) To prepare annual maintenance plan with WUA and design and estimate for maintenance and repair works based on Walk Through Survey (WTS) 8) To prepare the required budget for the next fiscal year for repair and maintenance of irrigation facilities 9) To execute repair / rehabilitate / maintenance of Kankai headworks and main canal system. 10) To prepare the Project monitoring sheets in collaboration with the municipalities and WUA 11) To provide trainings of water management and maintenance of irrigation facilities to WUA / gate Operate for proper O&M of irrigation facilities. 12) To prepare training materials for O&M of irrigation facilities. 13) To assist the WUA and farmers in on-farm development (construction of field canals, division boxes and land levelling) 14) To prepare drafts of guidelines for irrigated agriculture model.
Local Level	Task Team: WUA	Develop Irrigated Agriculture Model in KIS	1) To implement O&M below secondary canal system (secondary and tertiary canals and field channel and on farm structures). 2) To prepare annual cropping calendar 3) To distribute irrigation water based on water distribution plan below secondary canal system. 4) To provide training to gate operators to measure water discharge 5) To monitor water distribution with KIMO 6) To prepare annual maintenance plan with KIMO through WTS 7) To generate repair and maintenance fund from the users to repair and maintain Secondary Canals (SCs), Tertiary Canal (TCs) and Field Channels (FCs) 8) To prepare simple and transparent canal cleaning rules and undertake canal cleaning regularly 9) To establish simple and transparent irrigation service fee (ISF) collection system and collect ISF 10) To collect O&M fees for special maintenance. 11) To assist farmers for construction of field canal, division box and land levelling. 12) To support farmer's groups (FG) in the model sites for market-oriented agriculture activities.
Local Level	Task Team: Municipalities (Shivasatakshi / Gauradaha Rural Municipalities (Gaurigunj / Kamal)	Contribute to develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation area under their constituencies	**<Output 2 Activities>** 1) To coordinate with KIMO/WUA to select model sites in KIS 2) To undertake periodic monitoring to ensure that water is distributed equitably based on crop water requirements, water availability and coverage 3) To stimulate water users to regularly participate, contribute and implement canal cleaning rules prepared by the users themselves 4) To assist water users to use water efficiently at the farm level by providing assistance for (a) levelling farms and (b) constructing field channels **<Output 3 Activities>** 1) To support the implementation of the market-oriented agriculture to farmers using CAP approach

Organization		Roles	Responsibilities
Local Level	Task Team: Municipalities (Shivasatakshi / Gauradaha Rural Municipalities (Gaurigunj / Kamal)	Contribute to develop Irrigated Agriculture Model in KIS and scale up the model to other irrigation area under their constituencies	2) To assist farmers to improve production and productivity in KIS command area through enhancing their access to improved production technologies like seeds, fertilizers, farm machineries, post-harvest technologies, and participate and contribute to capacity building related works/activities 3) To coordinate with Chandradangi Agriculture Development Farm (CADF), WUA, AKC and TCP-PIAT to provide short-term training and capacity building of frontline extension workers working at their respective area 4) To coordinate with KIMO, WUA and TCP-PIAT to provide short-term training and capacity building of WUA members/farmers 5) To undertake agribusiness promotion related task to support farmers (KIS command area) to strengthen linkages and access to markets (Grow for Sale approach)

Source: prepared by JICA Project Team based on the results of the fourth JCC Meeting on 21st April 2023

1.7 Experts of JICA Project Team

The following five international experts and nine national experts/staffs are assigned as JICA Project Team:

Table 1.7-1 Member of International Experts

Nos.	Position	Name
1	Chief Advisor / Water Distribution Plan	Akira KAWAI
2	Deputy Chief Advisor / Water Management/ Improvement of FC	Ryosuke MAKINO
3	Market-Oriented Agriculture	Shohei NATSUDA
4	Facility O&M / WUAs Strengthening 1	Kenichi SHIBUTA
5	Training / WUAs Strengthening 2	Satoko IWASAKI / Rio OKAJIMA

Source: JICA Project Team

Table 1.7-2 Member of National Experts / Staffs

Nos.	Position	Name	Assignment Period
1	Agriculture Expert 1	Birendra Bir Basnyat	April 2021 to February 2025
2	Agriculture Expert 2	Bhumi Prasad Kaphle	April 2021 to October 2024
3	Agriculture Expert 3	Narayan Giri	November 2022 to February 2023
4	Irrigation Expert 1	Rashmi Ranjan Jha	April 2021 to October 2024
5	Irrigation Expert 2	Harish Chandra Bhusal / Puskar Raj Rijal	April 2021 to February 2023
6	WUA Expert	Ram Narayan Kshetri	April 2021 to February 2025
7	GIS Expert / Irrigation Assistant Engineer / CAD Operator	Ayush Poudel	September 2021 to February 2023
8	GIS Expert 2	Sushil Khadka	November 2022 to May 2023
9	Office Secretary	Srijana Sapkota	April 2021 to February 2025

Source: JICA Project Team

The assignment schedule of the experts of JICA Project Team of Phase-2 is presented in Attachment 1.2.

1.8 Work Schedule

The overall work schedule was prepared after the commencement of Stage-1 and confirmed in the 1st JCC meeting in May 2021 as a part of the W/P. During the implementation of the Project activities, the work schedule was reviewed and revised based on the actual progress and delay due to the external factors such as restriction against COVID-19 etc. as follows:

Table 1.8-1 Revision of Overall Work Schedule

Schedule	Time of Revision	Major External Factors affecting Schedule
Original	May 2021 Work schedule was confirmed in 1st JCC meeting	N/A
Revision 1	October 2021 Work schedule was reviewed and revised with KIMO (PM)	➢ JICA Project Team could not carry out field activities from April to August 2021 due to lockdown / curfew against COVID-19
Revision 2	January 2022 Work schedule was revised and confirmed in 2nd JCC meeting	➢ Continue restriction of workshop and meeting due to COVID-19 ➢ Start of rehabilitation works of Kankai headworks from Nov. 2021 (no water supply) ➢ As additional work, field survey & finding of alternative water resource (Shallow Tube Well (STW)) was conducted by KIMO & JICA Project Team.
Revision 3	July 2022 Work schedule was revised and confirmed in 3rd JCC meeting	➢ No water distribution from main canal until May 2022 due to headworks rehabilitation works ➢ Local election conducted in May 2022 ➢ WUA election was postponed at several times (finally started in February 2023)
Revision 4	April 2023 Work schedule was updated based on the W/P for Stage-2 and confirmed in 4th JCC meeting	➢ Based on the W/P for Stage-2 (Mar. 2023 to Feb. 2025)

Source: JICA Project Team

The latest overall work schedule (Revision 4) is presented in Attachment 1.3.

1.9 Procurement of Equipment

The list of equipment procured during the Project period is presented in Attachment 1.5. The all equipment has been handed over to GON as presented in Attachment 1.6.

CHAPTER 2 ACHIEVEMENT OF THE PROJECT

2.1 Achievement of the Project Purpose

In the Project Design Matrix (PDM), the Project Purpose is defined as follows.

Narrative Summary
The model of Irrigated Agriculture is formed by the collaboration among the Federal, Provincial, Local Governments and Water Users Associations (WUAs).

Objectively Verifiable Indicators
The Model of Irrigation Agriculture developed by the Project is approved the Joint Coordination Committee (JCC).

Means of Verification
Minutes of JCC

Important Assumptions
Government policy of Nepal on Irrigated Agriculture will not change largely.

Achievement Status: 100% achieved

Through the Project, "PIAT Model" was developed as an Irrigated Agriculture model. The contents of PIAT Model were compiled into drafts of guidelines and manuals, which were approved at JCC meeting in January 2025.

The guidelines and manuals were compiled as separate deliverables from the Project Completion Report, with 38 copies distributed to Project Director (PD) and 2 copies to Japan International Cooperation Agency (JICA).

2.2 Achievement of Outputs

Following shows summary of each outputs written in the PDM.

Output 1: Formulation of Action Plan by the Stakeholders of Kankai Irrigation Scheme (KIS)

Output 2: Establishment of Equitable Water Distribution / Improvement of operation & maintenance (O&M) of Facilities

Output 3: Increase of Income of Farmers through Practice of Market-oriented Agriculture

Output 4: Establishment of Cooperation / Collaboration System among stakeholders for improvement of irrigated agriculture in KIS

2.2.1 Output 1 Formulation of Action Plan by the Stakeholders of KIS

For detail of this output, following is defined in the PDM as output.

Narrative Summary
The issues regarding the Irrigated Agriculture in KIS are analyzed and shared by the stakeholders, and the Action Plans for solution of the issues are formulated.

Objectively Verifiable Indicators

Formulated Action Plans

Means of Verification

Project Report

Important Assumptions

The Project implementation System of Department of Water Resources and Irrigation (DWRI), Provincial Government, Municipalities and WUAs concerned will not change largely.

Market Circumstance of agricultural products will not change largely.

Achievement Status: 100% achieved

In Phase-1 of the Project (Feb. 2019 – May 2020), Action Plan was formulated through workshop which WUA members participated. And then, based on this Action Plan, Phase-2 of the Project (Apr. 2021 – Mar 2025) was formulated.

2.2.2 Output 2 Establishment of Equitable Water Distribution / Improvement of O&M of Facilities

For detail of this output, following is defined in the PDM as output.

Narrative Summary

Equitable and efficient water distribution system is established by the improvement of water distribution planning and its implementation up to tertiary level, appropriate O&M of facilities and constructions of field channels (FCs), etc.

Objectively Verifiable Indicators

1) Formulation of water distribution plan i) from main canals to secondary canals and direct tertiary offtakes and ii) from secondary canals to tertiary canals based on updated command area
2) Implementation and monitoring of water distribution i) from main canals to secondary canals and direct tertiary offtakes and ii) from secondary canals to tertiary canals in selected eight model secondary canals based on water distribution plan.
3) Constructions of 12 km FCs
4) Formulation of facility maintenance plan of i) main canals, ii) secondary canals, iii) selected model tertiary canals (13 Nos.) and iv) tertiary canals selected by WUA from non-model secondary canals (at least 1 tertiary canal per secondary canal) and initiating its implementation
5) Increase of annual irrigated area by 7%
6) Increase of Irrigation Service Fee (ISF) collection amount to 1.5 times that one before the project through increase of ISF collection rate

Means of Verification

1) & 2) Reports of Kankai Irrigation Management Office (KIMO) and WUAs
3) Interview with KIMO and WUAs, On-site inspection
4) Reports of KIMO and WUAs, On-site inspection
5) Reports of KIMO and WUAs, Interview with farmers

6) Report of WUAs

Important Assumptions

The Project implementation System of DWRI, Provincial Government, Municipalities and WUAs concerned will not change largely.

Market Circumstance of agricultural products will not change largely.

(1) Formulation of Water Distribution Plan

Achievement Status: 100% achieved

i) Main Canals (MCs) to Secondary Canals (SCs) & Direct Tertiary Offtakes (DTOs): 5/5 lines. (100%)

ii) SCs to Tertiary Canals (TCs): 22/22 Secondary Canal Committees (SCCs). (100%)

Water distribution plans were prepared as shown above by WUA, KIMO and JICA Project Team. Especially plan for SCs to TCs were prepared by WUA by themselves. Both of 1) plan for rainy cropping season and 2) plan for winter / spring cropping seasons were prepared in each area.

(2) Implementation and Monitoring of Water Distribution

Achievement Status: 100% achieved

i) MCs to SCs & DTOs: 5/5 lines. (100%)

ii) SCs to TCs: 8/8 SCCs (100%)

Water distribution was implemented based on formulated plans.

In case of MCs to SCs & DTOs, KIMO's gate keepers took a role and responsibility to implement it. And KIMO and Main Canal Committee (MCC) monitored it.

In case of SCs to TCs, SCC members especially SCC chairman took a role and responsibility to implement it. And SCC chairman monitored it.

Detail description of activities for this output is shown in Chapter 3.2.1.

(3) FC Construction

Achievement Status: 103% achieved

Constructed Length of FC: 12.39/2.00 km (103%)

Mainly in model and replication sites, above length of FC was constructed by WUA members themselves. Water distribution on farm level was improved by it.

Importance and effectiveness of FC was understood by WUA in these sites. And it was observed that WUA members acquired know-how on FC construction.

Detail description of activities for this output is shown in Chapter 3.2.1.

(4) Formulation of Facility Maintenance Plan and Its Implementation

Achievement Status: Shown in following Table

Table 2.2-1 Achievement Status for Formulation of Facility Maintenance Plan and Its Implementation

Category	Preparation of Maintenance Plan	Implementation of Maintenance
MCs	5/5 lines (100 %)	5/5 lines (100 %)
SCs	22/22 lines (100 %)	19/22 lines (86 %)
Model SCs	8/8 lines (100 %)	7/8 lines (88 %)
Non-model SCs	14/14 lines (100 %)	12 /14 lines (86 %)
Model TCs	13/13 lines (100 %)	4/13 lines (31 %)
TCs in non-model SCs	14/14 lines (100 %)	5/14 lines (36 %)

Source: JICA Project Team

(a) Maintenance Plan Preparation

Annual Maintenance Plan was prepared in all target canals.

(b) Implementation of Maintenance

The maintenance status at MCs and SCs were generally favourable. Interviews with several SCC chairmen regarding the factors that enabled successful maintenance revealed the following as important and effective:

i) Jointly considering and agreeing on the plan among SCC members, which fostered a sense of ownership among them.
ii) Formalizing the plan in writing.
iii) Raising awareness of the importance of maintenance.

The implementation rate of maintenance at TCs was low. The following reasons were observed or inferred as contributing factors:

i) Target date of implementation of maintenance is set immediately before commencement of spring / rainy irrigation season. So, it was not implemented at the end of the Project.
ii) Sufficient announcements and requests regarding the preparation of maintenance plans and the implementation of maintenance may not carried out.
iii) It is presumed that there were still variations in understanding, motivation, and ownership regarding the importance of maintenance at the TC level.
iv) With maintenance being carried out at SC level and resulting in improved water distribution conditions, the importance and necessity of maintenance at TC level may have diminished among Tertiary Canal Committee (TCC) members.

As same as the plan preparation, continual activities and / or support is required for implementation of maintenance.

(5) Increase of Annual Irrigated Area

(a) For Whole Area of KIS

Achievement Status: 37% was achieved (100% in case of focusing in only winter and spring season)

Table 2.2-2 Increase of Annual Irrigated Area (In Whole Area of KIS)

Category	Before the Project (A)	After the Project (B)	Changed Ratio (C) = (B) / (A)	Achievement Ratio for Target[*1] (D) = ((C) -100) / 7%
Whole Area in KIS				
In Rainy Season	8,647 ha	8,647 ha	100 %	0 %
In Winter Season	2,148 ha	2,166 ha	101 %	12 %
In Spring Season	2,802 ha	3,133 ha	112 %	169 %
In Annual	**13,597 ha**	**13, 946 ha**	**103 %**	**37 %**

**1: Target Value of Increased Ratio is 7%*
Note: Cropping intensity was examined in Baseline Survey and Endline Survey, and irrigated area was converted and calculated based on cropping intensity and updated command area (8,951.1 ha).
Source: JICA Project Team

The increase of cropping intensity in spring season is distinctive based on following factors.

i) Water distribution plan were prepared, and irrigation schedule is changed to covering the whole command area from biennial rotational irrigation.
ii) Contact farming with rice miller (fix rice price) and mechanised harvesting supported farmers to change their motivation to cultivate paddy in spring season from keeping their land fallow.

For the rainy season, at before the Project, cropping intensity had already reached almost 100%, so there was no room for further increase. Focusing on the increases only in winter and spring seasons, the results will be as shown in the table below, and the achievement rate of the target becomes **100%**.

Table 2.2-3 Increase of Irrigated Area in Winter and Spring Seasons

Category	Before the Project (A)	After the Project (B)	Changed Ratio (C) = (B) / (A)	Achievement Ratio for Target (D) = ((C) -100) / 7%
Whole Area in KIS				
In Winter Season	2,148 ha	2,166 ha	101 %	12 %
In Spring Season	2,802 ha	3,133 ha	112 %	169 %
Total	**4,950 ha**	**5,299 ha**	**107 %**	**100 %**

Source: JICA Project Team

(b) For Model Area of KIS

Achievement Status: 254% was achieved

And, focusing on the model sites, achievement ratio was **254%** as shown in following table. This suggests that certain activities conducted in only the model sites likely contributed to the increase in irrigated area within the model sites compared to the entire region.

Table 2.2-4 Increase of Annual Irrigated Area (In Model Sites)

Category	Before the Project (A)	After the Project (B)	Changed Ratio (C) = (B) / (A)	Achievement Ratio for Target*1 (D) = ((C) -100) / 7%
Model Sites in KIS				
In Rainy Season	247 ha	274 ha	111 %	157 %
In Winter Season	61 ha	85 ha	139 %	558 %
In Spring Season	80 ha	98 ha	122 %	320 %
In Annual	**388 ha**	**457 ha**	**118 %**	**254 %**

**1: Target Value of Increased Ratio is 7%*
Note: Cropping intensity was examined in Baseline Survey and Endline Survey, and irrigated area was converted and calculated based on cropping intensity and updated command area (8,951.1 ha).
Source: JICA Project Team

In model sites, the target was achieved in all copping seasons. Followings can be considered as success factors.

i) In non-model sites, some activities were not conducted. But, on the other hand, in model sites, all activities of TCP-PIAT were conducted. So, farmers' capacity for both of irrigation water management and market-oriented agriculture was developed strongly.
ii) Not only farmers' capacity, but also farmers' ownership and motivation for irrigated agriculture were raised through TCP-PIAT activities.

(6) ISF Collection Amount

Achievement Status: 100% achieved

Table 2.2-5 Increase of Collected ISF Amount

Before the Project (FY2020/21) (A)	After the Project (FY2023/24) (B)	Increased Ratio (C) = (B) / (A)	Achievement Ratio for Target*1 (D) = ((C) -100) / 50
NPR 1,617,183	NPR 2,427,874	150.1%	100%

**1: Target Value of Increased Ratio is 150%*
Source: JICA Project Team

As shown in above, ISF collection amount increased by 150.1% compared to before the Project implementation.

2.2.3 Output 3 Increase of Income of Farmers through Practice of Market-oriented Agriculture

For detail of this output, following is defined in the PDM as output.

Narrative Summary

The income and technical capacity of farmers in target scheme are increased through the practice of market-oriented agriculture.

Objectively Verifiable Indicators

1) Increase of targeted farmers' agricultural incomes of by 20%
2) 75% of farmers make farm business plan (crop, crop area, crop calendar, market information, production and gross income) and perform the market oriented activities based on the plan

Means of Verification

1) Reports of Baseline and End line Surveys
2) Interview with the farmers

Important Assumptions

The Project implementation System of DWRI, Provincial Government, Municipalities and WUAs concerned will not change largely.

Market Circumstance of agricultural products will not change largely.

(1) Increase of Farmers' Agricultural Incomes

Achievement Status: Achieved (more than 100%)

Table 2.2-6 Increase of Farmers' Agricultural Income (per Household (HH))

Category	Agriculture Income per HH before the Project (A)	Agriculture Income per HH after the Project (B)	Increased Ratio (C) = (B) / (A)	Achievement Ratio for Target*1 (D) = ((C) – 100) / 20%
1st Model	NPR 95,969	NPR 361,022	376%	1,381%
2nd Model	NPR 214,485	NPR 214,485	216%	579%
Total	**NPR 155,227**	**NPR 412,744**	**266%**	**829%**

**1: Target Value of Increased Ratio is 20% (in model sites)*
Source: JICA Project Team

Table 2.2-7 Increase of Farmers' Agricultural Income (per ha)

Category	Agriculture Income per ha before the Project (A)	Agriculture Income per ha after the Project (B)	Increased Ratio (C) = (B) / (A)	Achievement Ratio for Target*1 (D) = ((C) – 100) / 20%
1st Model	NPR 73,667	NPR 187,604	255%	773%
2nd Model	NPR 133,454	NPR 221,525	166%	330%
Total	**NPR 108,427**	**NPR 205,509**	**190%**	**448%**

**1: Target Value of Increased Ratio is 20% (in model sites)*
Source: JICA Project Team

138 HHs were surveyed, which is 80% of total 172 TCP-PIAT target farmers, join in Commercial Agriculture Promotion (CAP) approach activity from Model SCCs / TCCs. Achievement result was more than 100% in both case of i) per HH and ii) per ha.

(2) Preparation of Farm Business Plan and Implementation of Market Oriented Agriculture

Achievement Status: Achieved (more than 100%)

Table 2.2-8 Preparation Ratio of Farm Business Plan

Category	Total Respondent Farmers (A)	Farmers prepare Business Plan (B)	Preparation Ratio (C) = (B) / (A)	Achievement Ratio for Target*1 (D) = (C) / 75
1st Model	68	62	91%	121%
2nd Model	70	67	96%	128%
Total	**138**	**129**	**93%**	**124%**

**1: Target Value of Preparation Ratio is 75% (in model sites)*
Source: JICA Project Team

138 HHs were surveyed, which is 80% of total 172 TCP-PIAT target farmers, join in CAP approach activity from Model SCCs / TCCs. Before the Project, there are no written business plan before stating cultivation among the target farmers. After the Project, 93% of target farmers prepared business plan.

2.2.4 Output 4 Establishment of Cooperation / Collaboration System among stakeholders for improvement of irrigated agriculture in KIS

For detail of this output, following is defined in the PDM as output.

Narrative Summary

The Activity Cooperation System (ACS) for improvement of irrigated agriculture among stakeholders of KIS is established, and the results of the cooperation activities are diffused to other irrigation schemes in Terai area through the trainings.

Objectively Verifiable Indicators

1) Conducting four cooperation activities by different Task Team member
2) Formulated drafts of guidelines and manuals
3) Conducting trainings to stakeholders in other two irrigation schemes in Terai area

Means of Verification

1) Report of monitoring results on the cooperation activities
2) Drafts of guidelines and manuals
3) Report on the results of trainings

Important Assumptions

The Project implementation System of DWRI, Provincial Government, Municipalities and WUAs concerned will not change largely. Market Circumstance of agricultural products will not change largely.

(1) Cooperation Activities by Different Task Team Member

Achievement Status: 200% Achieved

Numbers of Conducted Activities: 8 Nos. / Target Numbers of Activities: 4 Nos.

Following cooperative activities were conducted.

i) Cleaning of Irrigation Canals by WUA, Local Governments (LGs), KIMO and Water Users
ii) Implementation of Spring Rice Promotion Program (AKC, WUA, LG, KIMO, Arzoo Rice Mill-Morang)
iii) Demonstration of polythene vegetable nursery for market- oriented vegetable production (AKC, LG, KIMO)
iv) Introduction of laser land leveller technology demonstration (KIMO, WUA, Agriculture Knowledge Centre (AKC), National Agriculture Research Centre (NARC))
v) Mechanical rice transplantation technology demonstration (AKC, WUA, LG, WUA)
vi) Establishment of Agriculture Machinery Custom Hiring Centre at WUA (Ministry of Industry, Agriculture and Cooperatives (MOIAC), KIMO, WUA)
vii) Conducting field-based agriculture mechanization training at WUA (Agribusiness Promotion Support and Training Centre (ABPSTC), AKC, WUA)
viii) Demonstration and use of combine harvester in rice (spring and rainy season)- (AKC, Arzoo Rice Mill, WUA, LG)

(2) Formulated Drafts of Guidelines and Manuals

Achievement Status: 100% Achieved

(Target: To formulate drafts of guidelines and Manuals.)

Both of the guidelines and manuals for promotion of irrigated agriculture (PIAT Model) for Terai Area were drafted. And it was confirmed and approved in 6th JCC meeting on 22nd December 2025.

(3) Trainings to Stakeholders in Other Irrigation Schemes in Terai Area

Achievement Status: 100% Achieved

(Target: To conduct trainings to stakeholders in other two irrigation schemes in Terai area)

Following training and workshop were conducted for i) Chandra Nahar Irrigation Scheme (CNIS) and ii) Chanda Mohana Irrigation Scheme (CMIS).

i) **Training**:
Period: Sept 4-6, 2024,
Venue: KIMO and WUA office
Objectives:
(a) To share the experience and activities of TCP-PIAT in KIS
(b) To introduce Kankai Model to the key stakeholders of CNIS and CMIS
ii) **Workshop**:
Period: September 22, 2024
Venue: Shivasatkakshi, Municipality Hall, Jhapa
Objectives:
(a) To share the "Promotion of Irrigated Agriculture Model (PIAT Model)" formed based on

the experience in KIS through joint efforts of key stakeholders

(b) To obtain input and suggestion from the participants on the draft guidelines prepared by the Project Task Team

2.3 Prospects of Overall Goal

In the PDM, the Project Overall Goal is defined as follows.

Narrative Summary
The Model Developed by the Project is practiced in Terai Irrigation Area.
Objectively Verifiable Indicators
At least One (1) Irrigation scheme where the Model has been practiced within three to five years after the completion of the Project.
Means of Verification
Report of DWRI
Important Assumptions
None

For further practice of the PIAT model in Terai Irrigation Area, following two action plans were prepared by counterparts (C/Ps) and stake holders. Prepared Action Plans are shown in *Annex B, Volume 8-1*.

i) Action Plan for promotion of the PIAT model in other area in KIS.
ii) Action Plan for promotion of the PIAT model in CMIS in Koshi Province.

Based on these, it is expected that the model will be promoted and practiced in other area in Terai Irrigation Area.

For further activities in KIS, it is expected that necessary activities will be continued by WUA, KIMO and LGs (i.e., Task Team of TCP-PIAT) mainly. To ensure it, Minute of Understanding (MOU) was prepared and signed among them to ensure each role and responsibilities. Prepared MOU is shown in *Annex B, Volume 8-2*.

In Chanda Mohana, Ministry of Water Supply, Irrigation and Energy, Koshi Province (MOWSIE) held Coordination Meeting on 26th December 2024 with MOIAC, Chanda Mohana Irrigation Management Office, AKC and WUA to aware necessity of Action Plan preparation.

In 6th JCC meeting held on 22nd January 2025, the meeting decided to select the following two (2) irrigation schemes, where the model will be practiced as the target of overall goal:

(a) CMIS, situated in the Sunsari district of Koshi province, will commence replicating the model from the next fiscal year, 2025/26. Additionally, the meeting recorded that concerned agencies have already initiated mutual meetings, carried out interaction programs, formed an ad hoc project Task Team, and prepared a draft three-year action plan (2025-26 to 2027/028).

(b) CNIS, situated in the Saptari district of Madhesh province, will commence replicating the model from the upcoming fiscal year, 2026/27. Canal rehabilitation works are ongoing, and many preparatory activities before the initiation of model replication remain to be implemented there. These preparatory works will be carried out in the next fiscal year, 2024/25.

2.4 History of Modification of the PDM

During the Project period, PDM was modified as shown in follows.

Table 2.4-1 History of PDM Modification

Nos.	Timing	Modified Contents / Remarks	Reference
1	At beginning of the Project (Since Mar 2021)	**PDM version 1** As initial PDM, values of "Objectively Verifiable Indicators" are blank. Refer to Attachment 2.1. Related Monitoring Sheet: Version 1 - 4	Minuets of Meeting for Amendment of the R/D (on 29th Oct. 2020) Refer to Attachment 3.2.
2	3rd JCC Meeting on 29th Jul. 2022 (Middle term of Stage-1 of Phase-2)	**PDM version 2** Based on Baseline Survey result, "Objectively Verifiable Indicators" was set in 3rd JCC meeting. Refer to Attachment 2.2. Related Monitoring Sheet: Version 5 - 8	Minutes of 3rd JCC Meeting. Refer to Attachment 4.3.
3	Nov. – Dec. 2022 (End of Stage-1 of Phase-2)	JICA Project Team explained the following to JICA: i) Various external factors that have arisen, affecting the Project activities ii) Restrictions on activities and delays in progress due to (i) above iii) Budget shortages caused by the weak yen and rising prices JICA Project Team also informed JICA that the above conditions might lead to partial or complete failure to achieve the PDM targets and therefore requested an increase in JICA Project Team's budget. However, due to budgetary constraints on JICA's side, only the budget increase for (iii) above was approved. In light of these circumstances, JICA and JICA Project Team agreed to consider modifying the target values of the PDM and the Project's scope of work.	N/A
4	4th JCC Meeting on 21st Apr. 2023 (Beginning of Stage-2 of Phase-2)	The Task Team discussed and proposed the adjustment of some "Objectively Verifiable Indicators" in the PDM to lower their thresholds. However, Joint Secretory (JS) commented that the indicators should remain unchanged to motivate the related parties to achieve the targets. He also recommended reviewing the targets in December 2023 based on the progress at that time.	Minutes of 4th JCC Meeting Refer to Attachment 4.4.
5	9th Project Monitoring Committee (PMC) Meeting on 5th Dec. 2023 (Middle term of Stage-2 of Phase-2)	Based on the achievement and progress of the PDM targets, adjustments and clarification of some targets were discussed and agreed upon. After the PMC meeting, this was reported to JS by PD, but JS commented that any modification of the PDM shall be officially approved at the JCC meeting. Therefore, it was decided to finalize the modifications in the next JCC meeting.	Minutes of 9th PMC Meeting
6	5th JCC Meeting on 3rd Apr. 2024	**PDM version 3** Based on progress, achievement, site condition and conclusion of 9th PMC meeting, "Objectively	Minuets of Meeting for Amendment of

	(Middle term of Stage-2 of Phase-2)	Verifiable Indicators" was modified in 5th JCC meeting. And then it was defined through amendment of the R/D. Refer to Attachment 2.3. Related Monitoring Sheet: Version 9 - 10	the R/D (on 5th May 2024) Refer to Attachment 4.5.
7	6th (Final) JCC Meeting on 22nd Jan. 2025 (End term of Stage-2 of Phase-2)	**PDM version 4** "Objectively Verifiable Indicators" for Overall Goal was set. Refer to Attachment 2.4.	Minuets of 6th JCC Meeting Refer to Attachment 4.6.

Source：JICA Project Team

CHAPTER 3 PROJECT ACTIVITIES

The Project's activities were set based on Record of Discussion (R/D) between Japan International Cooperation Agency (JICA) and the Government of Nepal (GON) as shown in following Table.

Table 3-1 Activity List of the Project (1/2)

Activity No.		Activity
Stage 1	Stage 2	
Overall Activity for the Project		
(1)	(29)	Preparation of Inception Report
(2)	(30)	Preparation of the Work Plan (Stage 1) and Monitoring Sheet (M/S) Ver. 2 / Preparation of Work Plan (Stage 2)
(3)	(31)	Establishment of and Organizing Joint Coordinating Committee
(4)	-	Organizing Kick-off Meeting (1st JCC)
(5)	(32)	Public Relations Activities
(6)	(33)	Preparation and Submission of Monitoring Sheet Ver. 3-5 / Ver. 7-9
(7)	-	Preparation of Project Progress Report and Monitoring Sheet Ver.6 (End of Stage 1)
(8)	-	Conducting Baseline Survey
(9)	(34)	Conducting Counterpart Training Programme in Japan
-	(35)	Conducting Endline Survey
-	(36)	Support of JICA Evaluation Mission
-	(37)	Organizing Seminar for Sharing Achievement
-	(38)	Preparation of Project Completion Report and Monitoring Sheet Ver. 10
Project Activity for Output 2		
(1) Improvement in Water Distribution (Planning & Operation)		
(10)	(39)	Update of Command Area of Kankai Irrigation Scheme
(11)	(39)	Conducting Basic Training for Water Distribution Plan for KIMO, WUA, and Extension Officer
(12)	(39)	Preparation of Water Distribution Plan
(13)	(39)	Training for Measurement of Water Distribution
(14)	(39)	Installation, Calibration, and Maintenance of Division Works and Measurement Facilities
(15)	(39)	Water Distribution at Secondary & Tertiary Canal
(16)	(39)	Monitoring and Evaluation of Water Distribution by MCC, SCC, and TCC

Source: JICA Project Team

Table 3-2 Activity List of the Project (2/2)

Activity No.		Activity
Stage 1	Stage 2	
(2) Improvement in Maintenance of Irrigation Facility		
(17)	-	Preparation of Irrigation Diagram for Irrigation Facility
(18)	(39)	Evaluation of Irrigation Facility/Preparation of Annual Maintenance Plan
(19)	(39)	Improvement on the System for Irrigation Service Fee (ISF) Collection
(20)	(39)	Support of WUA to Improve ISF Collection and Information Management
(21)	(39)	Training of WUA for Maintenance of Existing Irrigation Facility
(22)	(39)	Repair of Existing Irrigation Facility with Budget of KIMO, Rural Government & WUA
(3) On-farm Development		
(23)	(39)	Survey and Design for Division Box and Field Channel & Support for Construction by KIMO and WUA
(24)	(39)	Land Levelling
Project Activity for Output 3		
(25)	(40)	TOT in CAP Approach for Extension Officer and SMS
(26)	(41)	Farmer Training and Activity in CAP Approach
(27)	(42)	Study Tour of SRC-CAP Site
Project Activity for Output 4		
(28)	(43)	Periodical Monitoring for the Promotion of Irrigated Agriculture
-	(44)	Preparation of drafts of Guidelines & Manual for Promotion of Irrigated Agriculuture
-	(45)	Coordination with Grant Project
-	(46)	Organizing Workshop for Promotion of Irrigated Agriculture

Source: JICA Project Team

3.1 Overall Activities

Activity 1 / 29	**Preparation of Inception Report for Stage-1 & 2** (Note: This is document prepared in Japanese only for a step of the contract agreement between JICA and JICA Project Team (JPT).)		
Purpose	To show i) Outline of the Project, ii) Policy of Implementation and iii) Implementation Structure		
Expected Output	Inception Report (Japanese only)		
Target Area / Person	-	**Work Period**	Beginning of Stage-1 and Stage-2

Activities Results

1. Stage-1

Nos.	Item	Description	Implemented Period
1	To prepare the Inception Report for Stage-1.	JPT	Apr. 2021
2	To submit the Inception Report for Stage-1 to JICA Head Quarter (HQ).	JPT	9th Apr. 2021

2. Stage-2

Step	Activity	Main Implementer	Implemented Period
1	To prepare the Inception Report for Stage-2.	JPT	Mar. 2023
2	To submit the Inception Report for Stage-2 to JICA HQ.	JPT	13th Mar. 2023

Outputs from Activities	1. Inception Report for Stage-1 2. Inception Report for Stage-2
Others / Remarks	N / A

Activity 2 / 30	**Preparation of Work Plan (W/P) for Stage-1 & 2**		
Purpose	To prepare W/P and get approval by Joint Coordination Committee (JCC)		
Expected Output	Approved W/P for Overall & Stage-1, Stage-2		
Target Area / Person	-	**Work Period**	Stage-1: April 2021 to July 2021 Stage-2: March 2023 to June 2023

Activities Results

1. Stage-1

Nos.	Item	Description	Implemented Period
1	1st draft W/P for overall and Stage-1 was prepared.	JPT	April 2021
2	A series of discussions were made with key Counterparts (C/Ps) through online meeting, because of restriction due to COVID-19 and W/P was updated.	JPT, Deputy Director General (DDG) of Department of Water Resources and Irrigation (DWRI) (Project Director (PD)), Chief of Kankai Irrigation Management Office (KIMO) (Project Manager (PM)), Water Users Association (WUA) and Local Governments (LGs)	April to May 2021
3	Draft W/P was presented by PM, Chief of KIMO in the first JCC meeting	Chief of KIMO (PM)	31st May 2021
4	W/P was revised based on the comments from JCC member and approved by Joint Secretory (JS) of Ministry of Energy, Water Resources and Irrigation, Koshi Province (MOEWRI) and Chief Representative of JICA Nepal Office on 8th July 2021.	JPT	June to July 2021
5	Approved W/P and Nepali translated version were shared with JCC members.	JPT	August 2021

2. Stage-2

Step	Activity	Main Implementer	Implemented Period
1	1st draft W/P for stage-2 was jointly prepared.	Chief of KIMO (PM), JPT	March 2023
2	A series of discussions were made with key C/Ps and W/P was updated.	JPT, DDG of DWRI (PD), Chief of KIMO (PM), WUA, LGs and Agriculture Knowledge Centre (AKC)	March to April 2023
3	Draft W/P was presented by PM, Chief of KIMO in the 4th JCC meeting	Chief of KIMO (PM)	21st April 2023
4	W/P was revised based on the comments from JCC member and approved by JS of MOEWRI and Chief Representative of JICA Nepal Office on 7th June 2023.	JPT	7th June 2023
5	Approved W/P was shared with JCC members.	JPT	June 2023

Outputs from Activities	1. Approved W/P for Overall and Stage-1 2. Approved W/P for Stage-2
Others / Remarks	N / A

Activity 3, 4 / 31	**Establishing and Conducting of JCC Meeting**		
Purpose	To conduct JCC meetings to get approval of W/P, confirm achievement, examine and exchange the opinions on major issues		
Expected Output	Decision on the direction of the Project, Approval of W/P, Monitoring Sheets, Project Completion Report, any other documents, activity results.		
Target Area / Person	JCC members	**Work Period**	As below

Activity Results

The following JCC Meetings were conducted during the Project period. Chairperson was JS of MOEWRI.

Nos.	Date	Venue	Agenda	Conclusion / Discussion
1st	31st May 2021	Online meeting	1) Presentation on review of activities during Phase-1 and W/P of Phase-2 2) Presentation of achievement up to 31st May 202 3) Confirmation of roles of each stakeholder	1) The committee decided to circulate the draft W/P among JCC members and works plan would be updated based on the feedback. 2) Roles and responsibility of concerned stakeholders and status of C/Ps funds of KIMO and AKC for TCP-PIAT in next fiscal year were confirmed and accepted in JCC meeting.
2nd	21st January 2022	Physical Meeting at KIMO Office with Online Meeting	1) Achievement of the Project activities up to January 2022 2) Key results of the Project baseline survey 3) Revised overall work schedule 	The followings were discussed and accepted by JCC meeting. 1) The Project progress up to January 2022 2) Key results of Project baseline survey and received the report 3) Revised Project schedule which reflects changes due to COVID-19 effect.
3rd	29th July 2022	Physical Meeting at KIMO Office with Online Meeting	1) The major achievement of the Project activities up to July 2022 and further schedule 2) Revised Project overall work schedule 3) Setting of target values for the indicators in Project Design Matrix (PDM) 	The followings were discussed and accepted by JCC meeting. 1) Achievement and further schedule by to July 2022 2) Revised Project overall schedule (Rev.02) 3) Target value for the indicators in PDM

4th	21st April 2023	WUA Office at Jhapa with Online Meeting	1) Presentation of achievement of Stage-1 and draft W/P of Stage-2 for approval 2) Confirmation of updated PDM for approval 3) Confirmation of roles and responsibilities of each stakeholder 4) Confirmation of draft content of guidelines  	1) The meeting directed the Project to submit the revised W/P for Stage-2 to the chairperson of JCC for approval after incorporating comments and suggestions made in the meeting. 2) The meeting requested all the key stakeholders to further discuss on the need to revise the target values. The general opinions in the meeting were to identify measures that could make the Project to achieve targets rather than to revise targets at the middle of the Project implementation. 3) The meeting requested to revisit the roles and responsibilities of the Project stakeholders based on the revision of the W/P and commitments to meet the target values for the PDM indicators. 4) The contents of the guidelines were tentatively acceptable. However, final decision can only be made after the submission of the draft guidelines.
5th	5th April 2024	WUA Office at Jhapa with Online Meeting	1) Presentation of achievement and further W/P 2) Proposed revision of target of PDM indicator for approval  	1) The meeting reviewed and assessed the proposal for revision of PDM target presented by PM based on the achievement, and approved the revision the targets of following three indicators: i) Formulation of water distribution plan and its implementation ii) Formulation of annual maintenance plan and its implementation iii) Irrigation Service Fee (ISF) collection amount 2) The meeting proposed to amend R/D based on the recommendation of the JCC. 3) The meeting requested JICA and GON to extend the Project implementation period another 2 years.
6th (Final)	22nd January 2025	WUA Office at Jhapa with Online Meeting	1) Final update on Project activities and achievements 2) Submission of draft guidelines for the Promotion of Irrigated Agriculture in Terai and manuals 3) Submission of Three-Years action Plan for Continuation of Activities 4) Submission of Three-Years Action Plan for Replicating PIAT-Model in Chanda Mohana Irrigation	The meeting decided as follows: 1) Draft guidelines and manuals were approved. KIMO was required to submit the draft guidelines and manuals to Ministry of Water Supply, Irrigation and Energy (MOWSIE). Subsequently MOWSIE was requested to submit to MOEWRI for official procedures. 2) MOWSIE was requested to coordinate with all concerned agencies to

			Scheme (CMIS) in Koshi Province 5) Setting of overall PDM target 	implement three-year action plan for scaling up the PIAT model in Kankai Irrigation Scheme (KIS) under the Memorandum of Understanding signed by Project Task Team and replication of the model in CMIS. 3) The target of overall goal was set at least one (1) irrigation schemes, which the model will be practiced.

Others / Remarks	The minutes of JCC meeting were presented in Attachment 4.1 - 4.6

Activity 5 & 32	**Public Relations Activities**		
Purpose	To publicize Project activities		
Expected Output	Newsletters & Calendar		
Target Area / Person	-	**Work Period**	As below
Activity Results			

1. Publication of Project Newsletter (The originals are included in *Annex B Volume 1*)

Nos.	Time	Contents	Nos. of Printing	Distribution
1	June 2022	Brief explanation of the Project, site visit of JICA, introduction of Project member	275 (Nepali: 250, English: 25)	WUA (SCC, Tertiary Canal Committee (TCC)), Model farmers, Municipalities, KIMO, AKC, Federal and Province C/Ps, Leader farmers, JICA Nepal Office
2	Sep 2022	Selection of second model sites, agricultural market survey, introduction of agricultural extension worker & Secondary Canal Committee (SCC) chairman, construction of Parshall Flume (PF)	275 (Nepali: 250, English: 25)	
3	Jan 2023	Agricultural mechanization, interview with women farmer's group (FG) & chief of agriculture development section in Shivasatakshi, WUA election, water distribution	325 (Nepali: 300, English: 25)	
4	July 2023	Field Channel (FC) construction, collaboration activities with municipality, interview with agricultural extension officer, model farmer and Main Canal Committee (MCC) chairman	335 (Nepali: 297, English: 38)	
5	January 2024	9th Project Monitoring Committee (PMC) meeting, site visit of JICA mission, interview with agricultural extension officer & model farmer, overseas training in Japan	345 (Nepali: 307, English: 38)	
6	May 2024	5th JCC meeting, mechanization of rice transplanting, interview with SCC chairman & MCC vice chairman, canal protection and ISF collection campaigns agricultural extension officer	362 (Nepali: 337, English: 25)	
7	January 2025	Terminal Evaluation of TCP-PIAT Project, Dissemination Workshop, Introduce the experience of TCP-PIAT, Training on Dissemination of PIAT-model	275 (Nepali: 250, English: 25)	

2. Project Calendar

Time	Contents	Nos. of Printing	Distribution
April 2023	Nepali Year 2080	500	MCC, SCC, KIMO, Municipality, Ward Office, TCP-PIAT Office, AKC, Damak Veg Market, Birtamod Vege Market, Model farmers, Gate keeper, C/P and others

3. Other Public Relation Activity

1) Facebook Posting by WUA (Workshop, Canal cleaning by WUA, ISF collection activities, etc.)

ISF Collection Activity by ISF Collector (25 April 2024)

Canal Cleaning by SCC 2 (27 July 2024)

2) Distribution of Project posters to C/Ps

Project poster in English

Project poster in Nepali

Others / Remarks	N / A

Sample of Output

Source: JICA Project Team

Figure 3.1-1 Project Calendar (Sample)

Source: JICA Project Team

Figure 3.1-2 Newsletter (Sample)

Activity 2, 6, 7 & 33	**Monitoring Sheet Ver. 2 - 9**		
Purpose	To monitor the Project and report to Nepalese C/Ps and JICA Nepal Office		
Expected Output	Monitoring Sheet		
Target Area / Person	-	**Work Period**	As below

Activity Results

1. The following Monitoring Sheets were prepared based on the specified form by PM in cooperation with JPT
2. Monitoring sheets were submitted to PD by PM for review and confirmation.
3. Monitoring sheets were submitted to JICA Nepal Office and Joint Secretary of MOEWRI by PD after confirmation.

Ver.	Time of Submission	Period
2	July 2021	April to June 2021
3	August 2021	July to August 2021
4	February 2022	September 2021 to January 2022
5	August 2022	February to July 2022
6	February 2023	August 2022 to February 2023
7	August 2023	March to July 2023
8	February 2024	August 2023 to January 2024
9	August 2024	February to July 2024
10	February 2025	August 2024 to February 2025

Annex B Volume 2: Monitoring Sheet

Others / Remarks	Monitoring Sheet No. 1 was prepared at the end of Phase-1. Monitoring Sheet No. 10 (final version) is described in Activity 38.

Activity 9 & 34	**C/P Training in Japan**		
Purpose	To learn a modern water and irrigation facilities management, market-oriented agriculture practice and coordination among different government level and farmers' organizations in Japan.		
Expected Output	Training Report and Action Plan prepared by C/P trainees		
Target Area / Person	1st batch: 18 field officers 2nd batch: 12 high officials	**Work Period**	Preparation work: April to July 2023 Training: -1st batch: 22 Jul to 6 Aug. 2023 -2nd batch: 19 Aug to 27 Aug. 2023

Activity Results

1. Selection of Participants

The selection criteria for the training participants were set as follows:

Nos.	Criteria
1	To be a member of the JCC, PMC, or Task Team
2	To have enough ability to participate in the Project on an ongoing basis after participating in the training
3	To have a strong willingness to learn from the Japanese experience.
4	To have enough doses of COVID-19 vaccine approved in Japan
5	No physical or mental health problems

Attachment 1.4: List of Overseas Training and Participants
Note: 18 participants for Batch 1, 12 participants for Batch 2 (30 members in total)

2. Schedule

The training was conducted in two batches. Batch 1 was for related members from the site, and Batch 2 was for related members from Federal, Provincial & Local Government.

<Batch 1>

Date	Time	Type	Content	Venue
22 Jul.	～		Airflight (Kathmandu - Haneda)	
23 Jul.	～		Arrival at Haneda	
24 Jul.	9:30 ～ 12:00	Lecture	Briefing	JICA Tokyo
	13:00 ～ 14:10	Lecture	Orientation	JICA Tokyo
	15:00 ～ 16:00	Lecture	Policies for the Promotion of Irrigated Agriculture and Maintenance of Irrigation Facilities in Japan	Ministry of Agriculture, Forestry and Fisheries (MAFF)
	16:00 ～ 17:00	Lecture	Policies for Market-Oriented Agriculture and Agricultural Extension in Japan	MAFF
25 Jul.	13:30 ～ 15:00	Lecture	Outline and History of Ohigawa Land Improvement District, Organization and Role of Land Improvement District	Ohigawa Land Improvement District
	15:00 ～ 17:00	Inspection	Inspection of agricultural water utilization facilities (Tochiyama headworks, Shida-Haibara diversion works)	Ohigawa Land Improvement District
26 Jul.	9:00 ～ 10:30	Lecture	Formulation of water distribution plan, water management, facility maintenance	Ohigawa Land Improvement District
	10:45 ～ 12:15	Lecture	ISF collection methods, management of member lists	Ohigawa Land Improvement District
	14:15 ～ 17:00	Inspection	Inspection of Kawaguchi water intake, branch and Tertiary Canals (TCs)	Ohigawa Land Improvement District
27 Jul.	10:00 ～ 12:15	Inspection	Initiatives of advanced farmers in Yoshida rice fields located within the land improvement district	Yoshida rice field (Ohigawa Land Improvement District)
	14:30 ～ 16:30	Inspection	Initiatives of agricultural corporations engaged in facility horticulture	GreenTech
28 Jul.	10:00 ～ 12:00	Inspection	Examples of branding efforts	Fujinokuni Tea Museum

29, 30 Jul.			Documentation	
81 Jul.	10:00 ～ 12:00	Lecture	Review of the first week training	JICA Tokyo
	13:00 ～ 14:45	Lecture	Agricultural extension system at prefectural and municipal level, roles and activities of agricultural extension workers	JICA Tokyo
	15:15 ～ 17:00	Lecture	Initiatives for profitable agriculture	JICA Tokyo
1 Aug.	10:30 ～ 12:00	Lecture	Lecture on agricultural extension services	Tsukuba Promotion Center
	14:00 ～ 15:20	Inspection	Approaches of large-scale rice farmers	Yawara Agricultural Cooperative
	16:00 ～ 17:00	Inspection	Efforts to high value vegetable marketing	Mizuho Village Market
2 Aug.	9:00 ～ 10:30	Inspection	Initiative of organic farming	Japan Agricultural Cooperatives (JA) Yasato Organic Cultivation Group
	11:00 ～ 12:30	Inspection	Vegetable Cultivation by Agricultural Corporations	JA Yasato Organic Cultivation Group
	14:30 ～ 15:30	Inspection	Operation of an agricultural machinery center by an agricultural cooperative	JA Ibaraki- Minami
3 Aug.	10:30 ～ 12:00	Discussion	Courtesy call to JICA headquarters	JICA Tokyo
	10:30 ～ 12:00	Discussion	Preparation of Action Plan	JICA Tokyo
4 Aug.	10:30 ～ 12:00	Discussion	Preparation of Action Plan	JICA Tokyo
	13:00 ～ 17:00	Discussion	Training debriefing, evaluation, and closing ceremony	JICA Tokyo
5 Aug.			Airflight (Narita - Kathmandu)	
6 Aug.			Arrival at Kathmandu	

<Batch 2>

Date	Time	Type	Content	Venue
19 Aug.	～		Airflight (Kathmandu - Haneda)	
20 Aug.	～		Arrival at Haneda	
21 Aug.	9:30 ～ 12:00	Lecture	Briefing	JICA Tokyo
	13:00 ～ 13:40	Lecture	Orientation	JICA Tokyo
	14:30 ～ 15:00	Discussion	Courtesy call to MAFF	MAFF
	15:00 ～ 16:00	Lecture	Policies for the Promotion of Irrigated Agriculture and Maintenance of Irrigation Facilities in Japan	MAFF
	16:00 ～ 17:00	Lecture	Policies for Market-Oriented Agriculture and Agricultural Extension in Japan	MAFF
22 Aug.	13:30 ～ 15:00	Lecture	Outline and History of Ohigawa Land Improvement District, Organization and Role of Land Improvement District	Ohigawa Land Improvement District
	15:00 ～ 17:00	Inspection	Inspection of agricultural water utilization facilities (Tochiyama headworks, Shida-Haibara diversion works)	Ohigawa Land Improvement District
23 Aug.	9:00 ～ 10:30	Lecture	Formulation of water distribution plan, water management, facility maintenance	Ohigawa Land Improvement District
	10:45 ～ 12:15	Lecture	ISF collection methods, management of member lists,	Ohigawa Land Improvement District
	14:00 ～ 17:00	Inspection	Initiatives of advanced farmers in Yoshida rice fields located within the land	Yoshida rice field (Ohigawa Land

			improvement district	Improvement District)
24 Aug.	10:00 ～ 12:15	Lecture	Shizuoka Prefecture's agricultural promotion policies and activities of agricultural extension advisors	Shizuoka Prefectural Government
25 Aug.	10:00 ～ 14:00	Discussion	Preparation of Action Plan	JICA Tokyo
	14:00 ～ 17:00	Discussion	Training debriefing, evaluation, and closing ceremony	JICA Tokyo
26 Aug.	～		Airflight (Narita - Kathmandu)	
27 Aug.	～		Arrival at Kathmandu	

Others / Remarks	The 1st batch was originally scheduled to take place in Aug. 2022, but due to the Japanese government's countermeasures against Covid-19, the training was cancelled during Stage-1. After the C/P strong request to have the training in Japan rather than online training, it was decided to postpone the 1st batch to 2023 (no change in 2nd batch).

Photos

Lecture on Maintenance of Irrigation Facilities at MAFF (21 Aug.2023)

Site Inspection at Tochiyama Headworks (25 Jul. 2023)

Lecture on ISF Collection Methods at the office of Ohigawa Land Improvement District (23 Aug. 2023)

Site Inspection at FC of Ohigawa Land Improvement District (23 Aug. 2023)

Activity 8 & 35	**Baseline Survey & Endline Survey**		
Purpose	To evaluate Project Achievement		
Expected Output	Baseline Survey Report and Endline Survey Report (Ref: *Annex A Volume 3 & 4*)		
Target Area / Person	KIMO, WUA MCC & SCC, Individual Farmer	**Work Period**	As below

Activity Results

1. Baseline Survey

Step	Activity	Person in Charge	Implementation
1	To prepare the plan and methodology of Baseline Survey and draft questionnaires	JPT	May. 2021
2	To discuss and finalize Baseline Survey Plan and Questionnaire and confirmed with JICA	Task Team Member with JPT	Jun. 2021
3	To conduct questionnaire surveys to each target stakeholders: 1) KIMO 2) WUA MCC 3) WUA SCCs (22 Nos.) 4) Individual farmers (334 respondents)	Task Team member with JPT	Jun. to Sep. 2021
4	To compile and analysis of collected answers	Task Team member with JPT	Nov. to Dec. 2021
5	Preparation of draft Baseline Survey Report	JPT	Dec. 2021
6	Presentation of results of Baseline Survey in the 2nd JCC meeting	Task Team with JPT	Jan. 2022
7	Finalize and submission of Baseline Survey Report	Task Team with JPT	Feb. 2022

2. Endline Survey

Step	Activity	Person in Charge	Implementation
1	To prepare the plan and methodology of Endline Survey and draft questionnaires	JPT	Jun. 2024
2	To discuss and finalize Endline Survey Plan and Questionnaire and confirmed with JICA	Task Team Member and AKC with JPT	Jul. 2024
3	To conduct questionnaire surveys to each target stakeholders: 1) Overall survey on the whole KIS (338 respondents) 2) Agricultural survey on model farmers(138 respondents)	Task Team member with JPT	Aug. to Sep. 2024
4	To compile and analysis of collected answers	Task Team member with JPT	Oct. 2024
5	Preparation of draft Endline Survey Report	JPT	Nov. to Dec.2024
6	Presentation of results of Endline Survey in the 6th JCC meeting	Task Team with JPT	Jan. 2025
7	Finalize and submission of Endline Survey Report	Task Team with JPT	Jan. 2025

Others / Remarks	i) To optimize the survey period, the survey items of Endline Survey selected from the baseline survey questionnaire that are especially important for evaluation of the Project impacts (e.g., increase of produce and agriculture income for Model site activities) ii) The necessary data obtained from Endline survey was provided in advance to JICA Terminal Evaluation Team in Sep. 2024 due to the limited time for the Project evaluation.

Photos

Baseline Survey
Field Interview to KIS farmer (8 Sep. 2021)

Baseline Survey
Field Interview to KIS farmer (8 Sep. 2021)

Endline Survey
Orientation to Enumerators (3rd Aug 2024)

Endline Survey
Field Interview with KIS farmer (7th Aug 2024)

Activity 36	**Support for JICA Terminal Evaluation Survey Team**		
Purpose	To provide necessary documents and data to JICA Terminal Evaluation Survey Team		
Expected Output	-		
Target Area / Person	JICA Terminal Evaluation Survey Team	**Work Period**	September to October 2024

Activity Results

1. Terminal Evaluation Survey

1) The Terminal Evaluation was carried out from 20th Sep. to 3rd Oct. 2024
2) Meeting was held between JICA Terminal Evaluation Survey Team and Joint Secretary of MOEWRI on 2nd October 2024 and the minutes of meeting was signed.

2. Member of Evaluation Survey Team

Nos.	Assignment	Name	Position and Organization
1	Team Leader	Dr. SATO Katsumasa	Senior Advisor, JICA
2	Evaluation Planning	Ms. SHIROISHI Keiko	Team 3, Agricultural and Rural Development Group 1, Economic Development Department, JICA
3	Evaluation & Analysis	Mr. DOJUN Isao	Consultant, Chief Engineer, Chuo Kaihatsu Corporation

3. Support conducted by JPT

1) Provide data and documents related to the Project activities
2) Provide Project achievement based on the PDM indicator
3) Support for site visit and interview survey to the C/Ps and farmers in the model sites
4) Joint the meeting with the C/Ps in Federal and Provincial Governments

Others / Remarks	Minutes of Meetings between JICA Terminal Evaluation Team and MOEWRI are presented in Attachment 3.4

Photos

Site visit to irrigation facility (measuring device) in KIS

Interview to farmers (model and non-model) in KIS

Meeting with Joint Secretary of MOEWRI and DDG of DWRI on evaluation results

Signing of Minutes of Meeting on terminal evaluation results

Activity 37	**Seminar for Sharing of Project Achievement**		
Purpose	To share the activities and achievement of the Project and experience with other Nepal key stakeholders and donors in Nepal		
Expected Output	Share of the Project activities and achievement and received feedback Replication of model of irrigated agriculture in other irrigation schemes in Terai Plain		
Target Area / Person	Other Nepal stakeholders and donors in Nepal	**Work Period**	Jan. 2025 (at the completion of the Project)

Activity Results

The Project achievement seminar was jointly held by MOEWRI and JICA Nepal Office on 28th January 2025 as follows

Items	Programme
Date & Time	28th January 2025 (Tue), 09:00 to 12:30
Venue	Rato Baithak, Himalaya Hotel, Kathmandu
Chairperson	Joint Secretary of MOEWRI
Chief Guests	Secretary of MOEWRI, Secretary of MOALC
Participants	➢ MOEWRI, Ministry of Agriculture and Livestock Development (MOALD), DWRI, Department of Agriculture (DOA) Staff from Federal Government ➢ Development Partners ➢ Mayors and Chairperson from Local Government ➢ Koshi Province: MOWSIE, Ministry of Industry, Agriculture and Cooperatives (MOIAC), AKC, Chanda Mohana Irrigation Management Office ➢ Madhesh Province: Ministry of Public Infrastructure Development (MOPID), Ministry of Land Management, Agriculture and Cooperatives (MOLMAC): Chandra Nahar Irrigation Scheme (CNIS) ➢ Task Team: KIMO, Local Government, WUA
Programme	09:00 to 09:40 Welcome and chairing of guests 09:40 to 09:45 Welcome Speech by PD DDG of DWR 09:45 to 10:00 Project's key achievement, opportunities and good practices 10:00 to 10:15 A short video of promotion of irrigated agriculture in Terai 10:15 to 10:30 Handing over documents (guidelines and manuals) 10:30 to 10:45 Scaling up PIAT model in KIS 10:45 to 11:00 Replication of PIAT-model in CMIS, Sunsari, Koshi Province 11:00 to 12:00 Open discussions 12:00 to 12:20 Remarks by Guiest 12:20 to 12:30 Closing Remarks

Others / Remarks	Seminar Report is presented in Annex B Vol.8-3.

Photos

Presentation of Key Activities and Good Practices by JPT

Handing Over of drafts of Guidelines and Manual from JICA Chief Representative to Joint Secretary of MOEWRI

Activity 38	Preparation of Project Completion Report and Monitoring Sheet Ver. 10		
Purpose	To summarize the result and achievement of the Project in the report (i.e. this report).		
Expected Output	Project Completion Report		
Target Area / Person	-	**Work Period**	Jan. – Feb. 2025

Activity Results

Step	Activity	Person in Charge	Schedule
1	To draft the report and share it with related stakeholders to get their comments.	JPT	Jan. 2025
2	To update / finalize the report based on the comments.	JPT	Feb. 2025

Others / Remarks	Project Completion Report is prepared in English and Japanese based on the contract agreement between JICA and JPT.

Other Activity	Selection of Model Sites and Replication Sites		
Purpose	To support to select model sites and target FGs for 1st and 2nd years activities To support to select replication sites and target FGs for 3rd & 4th year activities for conducting and expansion of on-farm level water management and practice of market oriented agriculture through Commercial Agriculture Promotion (CAP) approach		
Expected Output	i) Selected model sites and list of FG (1st Year and 2nd Year) ii) Selected replication sites and list of FG (3rd Year and 4th Year)		
Target Area / Person	WUA and LG in KIS area	**Work Period**	1st Year Model sites: August to September 2021 2nd Year Model sites: August to September 2022 3rd Year Sites: June to August 2023 4th Year Sites: June to August 2024

Activity Results

1. Implementation Area of Activities

As presented in the following illustration, the construction of FC and on-farm development works under Output 2 and practice of market-oriented agriculture under Output 3 were conducted in the selected model sites.

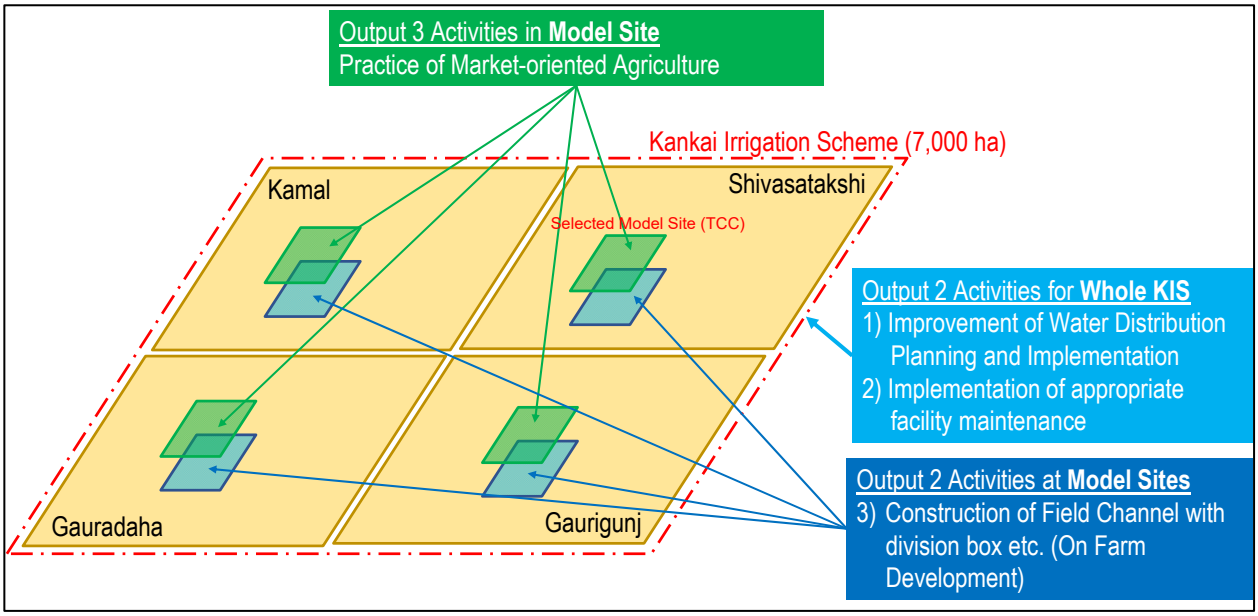


Figure 3.1-3 Image of Target Area for each Output

2. Selection Method and Criteria of Model Sites

Selection Criteria of TCCs
1) TCC member should be highly motivated to improve their capacity of irrigation operation and to learn agricultural skill for spreading to other TCC. 2) TCC should have no problem to take Irrigation water from Secondary Canal (SC). 3) Active farmer should be the member of TCC. 4) TCC member should be willing to pay the necessary cost for establish and operation of the demo farm. 5) Demo farm should be adjacent to farm road.
Selection Method
1) WUA and LGs discussed and proposed candidates of model sites to KIMO. 2) General meeting was conducted with candidate TCC members / farmers to confirm the scope of activities and their roles and responsibilities. 3) Evaluation was made by KIMO. 4) Minute of Understanding (MOU) was signed among LGs, WUA and KIMO after acceptance.

3. Established Selection Procedure

Step	Activities
Step-1	Submission of Proposal of Candidates of Model Site by LG
Step-2	Site verification by KIMO / WUA / LG
Step-3	Conduct General Meeting at Proposed Model Site before signing of MOU **<Objective>** 1. To get understanding of WUA and LG for followings. 1) Objective & Activities of Model Site 2) Role & Responsibility of WUA 2. To confirm necessary support from KIMO, LG and TCP-PIAT 3. To confirm Procedure and Schedule of Activities with WUA and LG 4. To get agreement (signing MOU) for above 1. ~ 3. among WUA, LG, KIMO and JPT **<Attendants>** 1. KIMO 2. LG: Representative of LG, Junior Technician / Junior Technical Assistant (JT/JTA) 3. WUA: MCC Chairman, 4. Model Site: SCC Chairman, TCC Chairman, and all members / farmers of TCC 5. JPT  **General Meeting at SCC-7, TCC-3/4 Gauriganj**
Step-4	Signing of MOU (Note: Minutes of General Meeting are attached to MOU.)
Step-5	Output 2 Activities: On Farm Development (OFD) works 1) Joint Site Inspection for planning of OFD works 2) Rough Cost Estimate, Adjusting Plan of OFD to fit budget 3) Agreement of OFD scope with SCC Chairman, TCC Chairman, all TCC members 4) Design work, Quantity Calculation, Cost Estimate 5) Contract Agreement for OFD Work 6) Commencement of OFD Work
Step-6	Output 3 Activities: Market Oriented Agriculture 1) Identification of Model Farmers 2) Identification of Leader farmers 3) CAP Orientation to Farmers (On the Job Training (OJT)) and series of CAP training

4. Selected Model Sites

Selected Model Sites in 1st Year (FY 2021 / 2022)

Municipality	Selected SCC	Selected TCC	Date of signing of MOU	Number of Farmers		
				Male	Female	Total
Shivasatakshi	SCC-1	TCC-6	23rd Sep. 2021	9	5	14
Gauriganj	SCC-10	TCC-10, 11	23rd Sep. 2021	12	9	21
Kamal	SCC-15	TCC-10, 11	23rd Sep. 2021	16	9	25
Gauradaha	SCC-17	TCC-2	23rd Sep. 2021	20	19	39
Total				**57**	**42**	**99**

Selected Model Sites in 2nd Year (FY 2022 / 2023)

Municipality	Selected SCC	Selected TCC	Date of signing of MOU	Number of Farmers		
				Male	Female	Total
Shivasatakshi	SCC-4	TCC-11 & 12	18th Sep. 2022	22	3	25
Gauriganj	SCC-7	TCC-3 & 4	20th Sep. 2022	0	29	29
Kamal	SCC-14A	TCC-1 & 2	23rd Sep. 2022	9	8	17
Gauradaha	SCC-20	TCC-5	20th Sep. 2022	24	14	38
Total				**55**	**54**	**109**

5. Selected Replication Sites

Based on experience of the model sites, for the promotion of the model, C/Ps (LGs, WUA and KIMO) replicate these activities in other sites (replication sites).

Selected Replication Sites in 3rd Year (FY 2023/ 204)

Municipality	Selected SCC	Selected TCC	Number of Farmers		
			Male	Female	Total
Shivasatakshi	SCC-10	TCC-8	8	9	17
Gauriganj	SCC-8	TCC-5 & 6	0	18	18
Kamal	SCC-14	TCC-5 & 6	6	2	8
Gauradaha	SCC-15	TE-23	2	6	8
Total			**16**	**35**	**51**

Others / Remarks	N/A

Photos

Kick-off Meeting among Stakeholders at Replication Site (TE-23) selected in Gauradaha Mun. (Dec. 2023)

Kick-off Meeting among Stakeholders at Replication Site (TE-23) selected in Gauradaha Mun. (Dec. 2023)

Joint Site Visit of TC after Kick-off Meeting at Replication Site selected in Gauradaha Mun. (Dec. 2023)

Kick-off Meeting at Replication Site (SC-10, TC-1,2,3&TB-8) in Shivasatakshi Mun. (Dec. 2023)

Kick-off Meeting at Replication Site (SC-10, TC-1,2,3&TB-8) in Shivasatakshi Mun. (Dec. 2023)

Kick-off Meeting at Replication Site (SC-10, TC-1,2,3&TB-8) in Shivasatakshi Mun. (Dec. 2023)

3.2 Output 2: Establishment of Equitable and Efficient Water Distribution

3.2.1 Improvement of Water Distribution Planning and Its Implementation

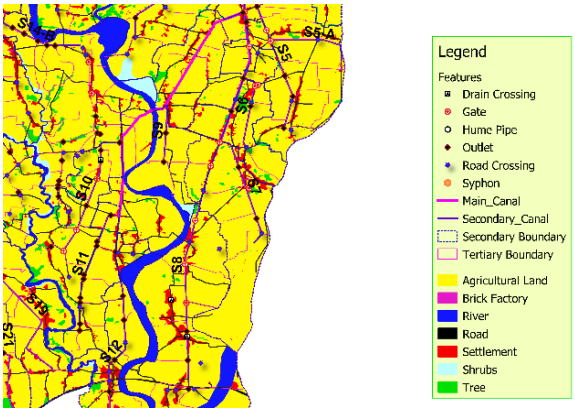
Activity 10 / 39	**Update of Command Area of KIS**		
Purpose	To update command area of KIS as base data for water distribution plan.		
Provided Output	1. Excel data & Maps for Updated Command Area		
Target Area / Person	Whole area of KIS	**Work Period**	Stage-1: Sept. 2021 – Dec. 2022, Stage-2: March 2023 – Apr. 2023

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	**Updating of Command Area by GIS**		
1-1	Collection and Review of Existing Document - To collect existing documents from KIMO. - To review it by JPT to confirm necessary information.	Main: JPT Support: KIMO	Mar 2021 – Aug 2021
1-2	Tracing of Integrated Water Resources Management Project (IWRMP) Command Area Map*1 - To trace IWRMP map by QGIS.	Main: JPT	Sept 2021 – Dec 2021
1-3	Awareness Creation Meeting - To hold site meetings to get WUA's understanding of purpose and importance of updating command area.	Main: KIMO & JPT	Feb 2022
1-4	Field Verification - To verify the accuracy of traced map by interviewing WUA (SCC, TCC and/or Direct Tertiary Offtake Committees (DTOC)) members and site confirmation with WUA (SCC, TCC and/or DTOC) members.	Main: JPT	Feb 2022 – Dec 2022
1-5	Command Area Updating by QGIS (Preparation of Command Area Map) - To update Command Area Map by QGIS. (Ref.: *Annex B Volume 3-1 Updated Command Area Map*) - To update Command Area (ha) by QGIS & Excel. (Ref.: *Annex B Volume 3-2 Updated Command Area*)	Main: JPT	Feb 2022 – Dec 2022
1-6	Announcement of Updated Command Area - To hold JCC Meeting to announce updated Command Area (ha)	Main: JPT	21st Apr 2023 4th JCC meeting
2	**GIS Training**		
2-1	GIS Training*2 - To hold classroom lectures to learn how to use QGIS.	Trainer: JPT Trainee: KIMO and staff of other Irrigation Scheme	2nd – 5th Feb. 2023

Others / Remarks	*1: Because there is no soft data of Map, which was prepared in IWRMP, in KIMO, so tracing map was prepared as base data of updating command area. *2: On the job training was also suggested and provided from JPT to KIMO in Field Verification, but, due to shortage of human resource, KIMO could not join it.

Photos



Sample of Traced Map

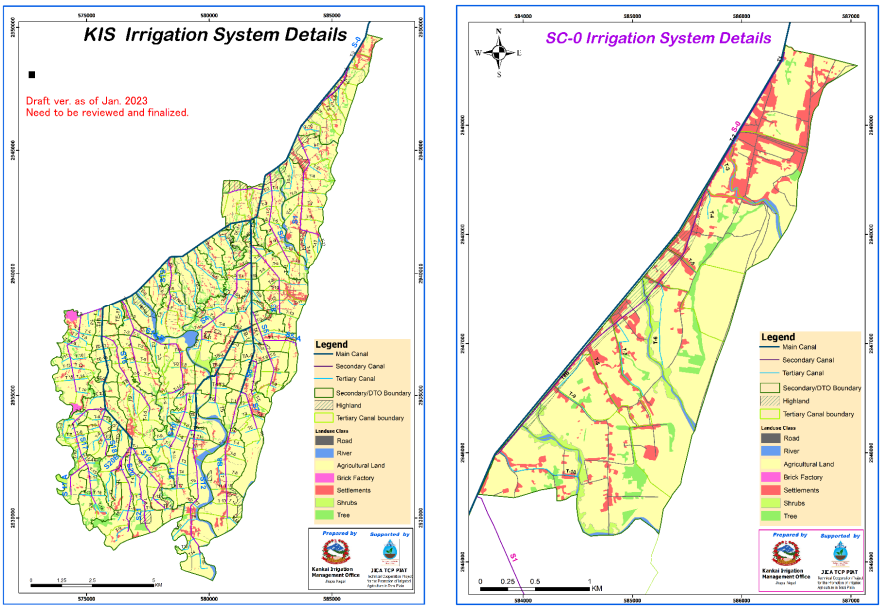
Awareness Creation Meeting

Site Confirmation with WUA members

Interview with WUA members

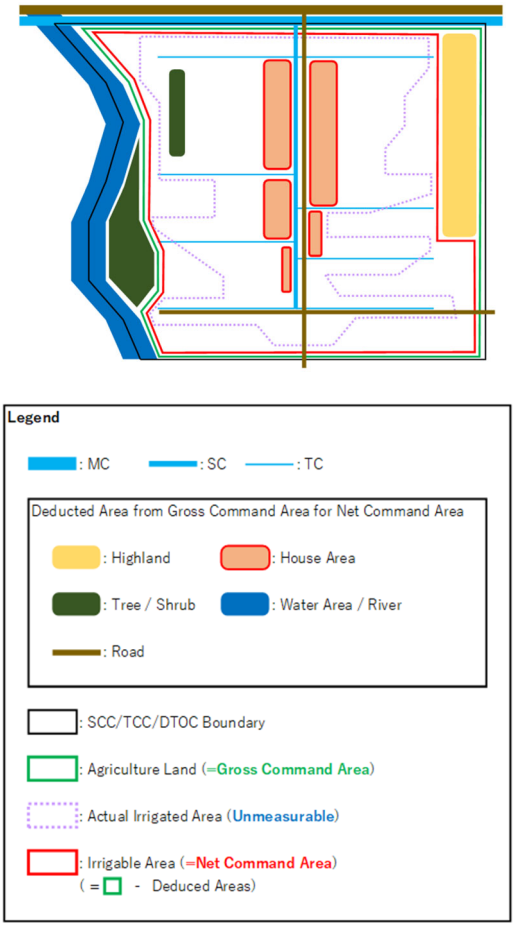
GIS Training

Sample of Output



Source: JICA Project Team

Figure 3.2-1 Updated Command Area Maps (Whole Area and Sample of SCC)



Source: JICA Project Team

Figure 3.2-2 Conceptual Image of Command Area

Table 3.2-1 Summary of Updated Command Area of KIS

MC	SCC	Original Area*1 (ha)	Area by IWRMP*1 (ha)	Updated Area (ha)*3
R-I	0	UNK	268.0	319.2
R-I	1	736.1	460.0	509.2
R-I	2	251.4	324.0	443.6
R-I	3	372.0	277.0	335.7
R-II	4	417.5	315.0	368.5
R-II	5	798.0	258.0	371.2
R-III	6	136.1	93.0	101.2
R-III	7	230.2	154.0	263.7
R-III	8	UNK	292.0	467.3
R-IV	9	126.5	123.0	129.9
R-IV	10	259.3	152.0	263.6
R-IV	11	144.4	131.0	132.3
R-IV	12	UNK	246.0	383.1
R-V	13	UNK	214.0	228.4
R-V	14	UNK	347.0	602.9
R-V	15	UNK	390.0	420.4
R-V	16	UNK	330.0	379.4
R-V	17	UNK	343.0	416.7
R-V	18	UNK	112.0	161.9
R-V	19	UNK	158.0	213.2
R-V	20	UNK	179.0	332.5
R-V	21	UNK	163.0	211.7
DTOs		796.7	1,621.0	1,895.5
Total		**7,000.0*2**	**6,950.0**	**8,951.1**

*1 Source: "Draft Final Report on Main Irrigation Canal Operation Plan for Crops in Kankai Irrigation System", April 2016, IWRMP, p12-13

*2 Breakdown of 7,000ha is unknown (UNK).

*3 It is under reiveiwing and checking.

Source: JICA Project Team

Activity 11/39	**Training on cropping calendar, crop water requirement, formulation of water distribution plan, water management techniques and land leveling to KIMO staff and WUA's member**		
Purpose	To provide training to KIMO staff and WUA's member		
Expected Output	Increase of knowledge and capability of KIMO staff and WUA's member to prepare the copping calendar, crop water requirement, formulation of water distribution plan, water management techniques and land leveling		
Target Area / Person	KIMO Staff, KIMO Gate operator WUA MCC/SCC member	**Implementation**	June 2022 to September 2024

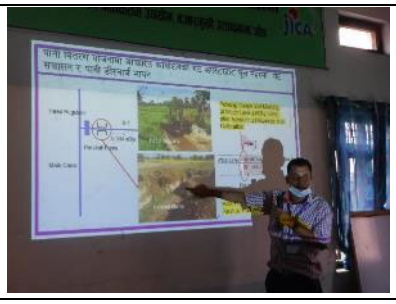
Activities Results

Following major trainings were conducted during the Project period.

1. Introductory Workshop and Training on Preparation of Water Distribution Plan for 2022

Nos.	Item	Description
1	Date & Time	1st June 2022, 9:00 to 15:00
2	Venue	Meeting Hall, WUA, Janta, Shivasatakshi, Jhapa (Physical Workshop)
3	Objectives	1) To introduce overall activity plan of TCP-PIAT, Phase-2 and explain current status and achievement 2) To discuss basic policy for water distribution for the coming rainy cropping season and prepare water distribution plan
4	Participants	1) KIMO Chief and Engineer 2) Chairman and Vice Chairman of WUA MCC 3) Representatives of WUA SCCs
5	Workshop Program and Summary of Results	**Part-I: Introduction of Outline and Activity Plan of TCP-PIAT, Phase-2** The outline and activity plan and achievement of TCP-PIAT, Phase-2 were introduced by JPT as below: 1) Session 1: Introduction of outline of TCP-PIAT, Phase-2, 2) Session 2: Activity plan of and achievement of equitable water distribution (Output 2-1) 3) Session 3: Activity plan and achievement of improvement of maintenance of facilities (Output 2-2) 4) Session 4: Activity plan of OFD (Output 2-3) 5) Session 5: Activity plan and achievement of practice of market-oriented agriculture TCP-PIAT, Phase-2 (Output 3)

Introduction of Activities Plan of TCP-PIAT, Phase-2 to WUA MCC and SCC Chairman in the Workshop



Discussion of Water Distribution Policy for Rainy Paddy with KIMO, WUA MCC and SCC

Part-II: Discussion on Water Distribution Plan for Coming Rainy Season Crop

1. Basic policy of water distribution for rainy season was discussed among WUA MCC and SCC and agreed as follows:
   1) To establish "Transparent and Equitable Water Distribution System" through preparation of Water Distribution Plan and execution of Monitoring and Evaluation

		2) To put priority to establish equitable water distribution along Main Canal (MC) to SC and MC to Direct Tertiary Offtake (DTO)) for coming Rainy Season 3) To calculate distribution discharge from MC to SC based on command area of SCC proportionally and control the water discharge using measuring device 4) To conduct water distribution inside SCC and TCC by the responsibility of each SCC/TCC 2. Water distribution plan for the coming rainy season was confirmed. 3. Monitoring and Evaluation Committee members and gate operator in each SCC were selected.

2. Meeting on Water Distribution Plan in Winter and Spring Season in 2022/2023

Nos.	Item	Description
1	Date & Time	28 November 2022
2	Venue	Office of President, WUA, Janta, Shivasatakshi, Jhapa (Physical Workshop)
3	Objectives	1) To discuss updated water distribution plan and distribution method for Winter and Spring Season in 2022/23 2) To sign MOU between KIMO and WUA for Water Distribution Plan for Winter and Spring Cros Season in 2022/23
4	Participants	1) KIMO Chief and Engineer 2) Chairman and Vice Chairman of WUA MCC
5	Agenda and Summary of Results	**1. Discussion on Tentative Water Distribution Plan for Winter and Spring**

Items	Winter Season	Spring Season
Target area for irrigation	Cropped area in whole scheme (SCC-0 to SCC-21) based on cropping calendar	SCC- 0 to SCC-12
Area to be irrigated	Approximately 2,690 ha	Approximately 3,810 ha
Irrigation period	16th December 2022 to 15th March 2023	16th March 2023 to 15th June 2023
Irrigation Method	Rotational Irrigation of Block 1 and 2	Continuous irrigation to the target area
Target crop	Maize, Mustard, Potato, Wheat, Buck wheat, Vegetable etc.	Maize, Spring Rice, Vegetable etc.
ISF collection	No ISF collection for winter season crop	To be collected from WUA member in above target area as per WUA regulation

2. Confirmation of Rotational Irrigation for Winter Crop Season

Rotational Block	SCC	Irrigated Area (ha)	Rotation Schedule
Block 1	SCC-0 to 12 (Reach I to IV)	1,867	Sunday to Tuesday
Block 2	SCC-13 to 21 (Reach-V)	823	Wednesday to Friday
	Total	**2,690**	

3. Workshop on Preparation of Water Distribution Plan in 8 Model SCCs

Nos.	Item	Description
1	Date	1st Stage: April to May 2023 2nd Stage: August to September 2023

2	Venue	Each SCC
3	Objectives	**1st Stage** 1) Identify current water distribution condition/status including opportunities, constraints and challenges in each model SCC. 2) Identify measures/processes including modality to improve the current water distribution system 3) Undertake preparatory works for preparing cropping calendar in the SCC command area **2nd Stage** 1) Selection of water distribution committee within SCC 2) Make awareness of necessity of water distribution rule and selection of water distribution committee in SCC 3) Preparation of water distribution rule in SCC for monsoon, winter and spring season 4) Agreement of basic policy and rule for water distribution within SCC
4	Participants	1) KIMO Staff 2) WUA MCC Representative 3) SCC Executive Member 4) Representatives from TCCs
5	Workshop conducted	

Model SCC	1st Stage		2nd Stage	
	Date	Participants	Date	Participants
1	1st May 2023	19 Nos.	25th Aug. 2023	2 Nos.
4	29th April 2023	22 Nos.	12th Sep. 2023	10 Nos.
7	27th April 2023	31 Nos.	9th Sep. 2023	8 Nos.
10	17th May 2023	16 Nos.	22nd Sep. 2023	8 Nos.
14	15th May 2023	29 Nos.	23rd Aug. 2023	12 Nos.
15	11th May 2023	12 Nos.	21st Aug. 2023	11 Nos.
17	25th April 2023	27 Nos..	16th Aug. 2023	20 Nos.
20	28th April 2023	20 Nos.	27th Aug. 2023	23 Nos..

Stage-1 SCC Workshop with SCC and TCC member on Water Distribution at SCC-17

Stage-2 SCC Workshop for discussion of Water Distribution Rule and Plan from SC to TCs (SCC20)

6	Results	1. In the Stage-1 workshop, the following opinions were raised regarding water availability in each SC.

Nos.	SC	Opinion regarding Water Availability
1	SC-1	Water is sufficient from head to tail SC (TC1 to TC11).
2	SC4	Only head and middle part of SC (TC1-TC7) have access to water in dry season.
3	SC7	Water is sufficient from MC to SC-7. But users do not use water in this SC. Farmers are not interested in agriculture farming. In some area growing vegetable by using Shallow Tube Well (STW).

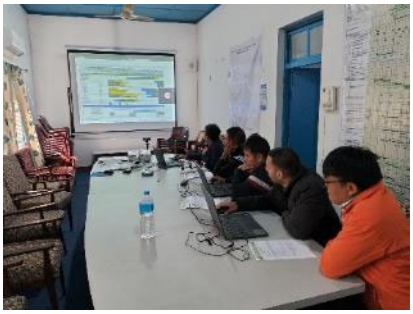
		4	SC 10	SC 3, 4, and 5 using more water, so not reaching sufficient water to SC 10. Access of water to only TC 1-5
		5	SC-14	Water is sufficient from MC to SC. But only in tail end part of 14B(TC-9) on ward water stops due canal condition is not good. In 14 and 14A water reach upto tail end.
		6	SC-15	Head part and some middle part of SC (TC-1 to TC-11) have access of water
		7	SC-17	Only head part SC (TC1 toTC8) have access of water, onward TC8 water stops.
		8	SC-20	Only head part and middle part SC20(TC1to TC5) and SC20B(TC3) have access of water.
		2. Almost all SCC representatives said the issues of water distribution were i) no cleaning canal, ii) unequitable distribution among TCs, iii) no distribution schedule and rule and those issues should be solved. 3. In 2nd stage, all SCCs selected water distribution committee inside SCC, who will be in charge of water distribution and coordination among the water users and prepared general distribution rules (rotational method).		

4. Workshop on Review of Water Distribution and Preparation of Plan for next Season with WUA MCC and SCC

Nos.	Item	Description
1	Date & Time	3rd December 2023
2	Venue	Meeting Hall of WUA, Janta, Shivasatakshi, Jhapa
3	Objectives	1) To review of water distribution in Monsoon Season in FY2023 2) To select water distribution committee in other non-model SCCs 3) To prepare water distribution plan for the next winter, spring and monsoon season. 4) To discuss other irrigation related activities (irrigation facilities maintenance, ISF collection, FC construction)
4	Participants	1) KIMO Chief and Engineer 2) Chairman and Vice Chairman, Secretary of WUA MCC 3) Chairman or representatives from 22 SCCs Total 37 Nos.
5	Agenda and Summary of Results	1) Water distribution in spring and monsoon season in FY 2023 assessed better than previous year, however SC-20 has expressed some issues of not sufficient water supply. 2) Water Distribution Workshop is effective for equitable water distribution; however impact can be evaluated after the implementation of the distribution plan. 3) WUA MCC agreed to form a Water Distribution Sub-Committee. 4) Preparation of cropping area by all SCCs will be done within 2 weeks. 5) Preparing facility maintenance plan in 8 model sites was accepted effective, but participants expressed doubt in implementation of the plan. 6) FC and OFD works for proper water distribution is necessary. 7) All model SCC chairmen agreed to achieve target of FC construction that is 12 km in total by the Project period. 8) All SCC chairmen agreed to collect ISF 100% as per the updated command area with new revised ISF rate, that is NPR 500/bigha (NPR 740/Ha)

		  WUA Workshop for review of water distribution in 2023 and preparation of water distribution for 2024 | WUA Workshop for review of water distribution in 2023 and preparation of water distribution for 2024

5. Training on Preparation and Implementation of Water Distribution Plan to KIMO Staff

Nos.	Item	Description
1	Date & Time	13th December 2023
2	Venue	Meeting Room of KIMO
3	Objectives	To provide technical training to KIMO staff how to prepare water distribution plan and how to use excel form as a tool
4	Participants	1) KIMO Chief 2) Engineer 3) Sub-Engineer x 2
5	Agenda and Summary of Results	1. JPT provided technical training on the following topic. 1) Preparation of cropping calendar in KIS and irrigation period 2) Preparation of irrigation diagram 3) Calculation of flow discharge for monsoon season 4) Calibration of PF and setting water level marking 5) Monitoring and evaluation of water distribution 6) Preparation of water distribution plan for Spring Season 2024 2. JPT handed over all computer file to prepare the above.   Training Workshop to KIMO Staff on Preparation of Water Distribution Plan | Training Workshop to KIMO Staff on Preparation of Water Distribution Plan
6	Product	The Project products related to water distribution are presented in *Annex B Volume 3-3 ~ 3-6*.

6. Workshop on Review of Water Distribution in Spring Crop Season 2024 and Preparation of Plan for next 2024/25

Nos.	Item	Description
1	Date & Time	25th May 2024

2	Venue	Meeting Hall of WUA, Janta, Shivasatakshi, Jhapa
3	Objectives	1) Review of Spring Crop Season 2) Cropping Plan and Water Distribution Plan for Monsoon Season 2024 and Winter/Spring 2024-25 3) Achievement of PDM Indicators Activities and Further Action
4	Participants	1) KIMO Chief and Senior Associate Officer 2) Chairman and Vice Chairman, Secretary of WUA MCC 3) Chairman or representatives from 22 SCCs Total 37 Nos.
5	Agenda and Summary of Results	1. Review of Spring Season Crop 1) Confirmation of SCC wise cropping area in Spring 2024 2) Experience sharing of i) land leveling, ii) use of rice transplanter, iii) Rice milling approach, iv) use of harvester 3) Review of water distribution and rotational method in Spring 2024 2. Cropping Plan and Water Distribution Plan for Monsoon Season 2024

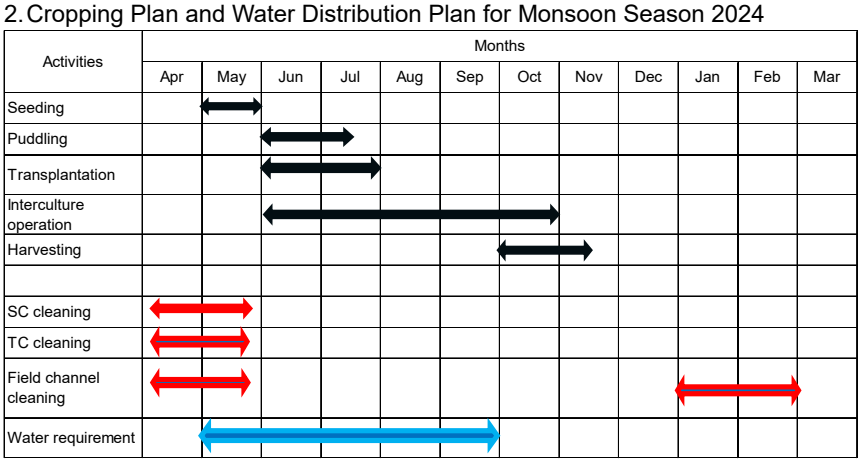


Figure 3.2-3 Cropping Plan and Water Distribution Plan for Monsoon Season 2024

WUA Workshop for review of water distribution in Spring 2024 and preparation of water distribution for 2024/25

WUA Workshop for review of water distribution in Spring 2024 and preparation of water distribution for 2024/25

Others / Remarks	N / A

Activity 12/39	**Formulation of water distribution plans i) from MC to SC and DTO, ii) from SC to TCs**		
Purpose	To formulate water distribution plan in KIS		
Expected Output	Water distribution plan along MC and Model 8 SCs		
Target Area / Person	MC to SC&DTO: Whole Scheme SC to TCs: 8 Model SCs (SC-1, 4, 7, 10, 14, 15, 17, 20)	**Implementation**	Sep 2021 to Sep. 2024

Activities Results

The following water distribution plans were prepared:

No.	Type of Water Distribution Plan	Prepared by	Implementation
1	Draft irrigation flow diagram along MC in whole KIS based on the original command area (6,950 ha)	KIMO and JPT	Sep. 2021
2	Water distribution plan for Monsoon Season 2022 from MC to SCs based on the original command area (6,950 ha)	KIMO and JPT	May 2022
3	Water distribution plan for Winter Season 2022/23 and Spring Season 2023 from MC to SCs based on the original command area (6,950 ha)	KIMO, WUA MCC and JPT	November 2022
4	Water distribution plan for Monsoon Season 2023 from MC to SCs & DTOs based on the updated command area (8,951 ha)	KIMO, WUA MCC and JPT	March to April 2023
5	Water distribution plan for Monsoon Season 2023 from SC to TCs in model SC based on the updated command area	KIMO, WUA MCC and JPT	April 2023
6	Water distribution rule within SCC in 8 model SC	SCC and TCC in 8 model SCs	Aug. to Sep. 2023
7	Water distribution plan for Spring Season 2024 from MC to SCs	KIMO, WUA and JPT	Feb 2024

Others / Remarks	Water distribution plans are presented in *Annex B Volume 3-4*.

Activity 13 / 39	**Training on water discharge measuring**		
Purpose	To establish water measuring system from MC to SCs To provide training to KIMO staff, gate operator and WUA to measure water discharge		
Expected Output	HQ Water Level Marking		
Target Area	Water Level Gauge and Water Level Marking: PF at All SCs (22 Nos.), Model TCs (13 Nos.)	**Schedule**	as below

Contents of Activities

1. Training for Water Discharge Measuring at Measuring Devices

Nos.	Canal	Measurement Points	Type of Measuring Devices	Measurement Date	Participants
1	MC	BP of Reach-II at Dhaule Chowk	Trapezoidal Concrete Lining	16 August 2022	KIMO Gate Operator WUA Member
2		BP of Reach-V at Dhaule Chowk	Trapezoidal Concrete Lining	17 & 21 August 2022	-ditto-
3		BP of Reach-III at Janta Chowk	Outlet of Culvert	22 August 2022	-ditto-
4		BP of Reach-IV at Janta Chowk	Outlet of Culvert	24 August 2022	-ditto-
5	SC-0	New PF at BP of SC-0	1.5FT Type of PF	27 June 2022	-ditto-
6	SC-1	Existing PF	3 FT Type of PF	3 July 2022	-ditto-
7	SC-3	Existing PF	2 FT Type of PF	5 July 2022	-ditto-
8	SC-4	Existing PF	2 FT Type of PF	6 July 2022	-ditto-
9	SC-9	Existing PF	2 FT Type of PF	20 July 2022	-ditto-
10	SC-10	Existing PF	1.5 FT Type of PF	22 July 2022	-ditto-
11	SC-11	Existing PF	1 FT Type of PF	25 July 2022	-ditto-
12	SC-13	Canal Section at BP of SC-13	Trapezoidal Concrete Lining	26 July 2022	-ditto-
13	SC-15	Existing PF	3 FT Type of PF	7 August 2022	-ditto-
14	SC-17	New PF	2 FT Type of PF	8 August 2022	-ditto-
15	SC-19	Canal Section	Concrete flume	9 August 2022	-ditto-
16	SC-20	Canal Section	Concrete flume	9 August 2022	-ditto-
17	SC-21	Canal Section	Concrete flume	9 August 2022	-ditto-
18	SC-1, T-6	Existing PF	9 inch of PF	18 July 2022	-ditto-

Note: PF: Parshall Flume, BP: Beginning Point

PF of SC-0 (Trial Water Discharge Measurement)

PF of SC-10

PF of TC-6 of SC-1

2. Training for Water Discharge Measuring to KIMO Staff

Nos.	Canal	Measurement Points	Type of Measuring Devices	Measurement Date	Participants
1	MC	MC along Reach IV	Trapezoidal Concrete Lining / Culvert	24 March 2023	KIMO Engineer, Sub-Engineer

2	DTO-7 along Reach II of MC	PF	6 inch Type of PF	20 July 2023	-ditto-
3	DTO-11 along Reach II of MC	PF	9 inch Type of PF	25 July 2023	-ditto-
4	DTO-12 along Reach II of MC	PF	9 inch Type of PF	2 August 2023	ditto-
5	DTO-TA-1 along Reach III of MC	PF	6 inch Type of PF	10 August 2023	ditto-

		
On-site Training for Water Discharge Measurement for Reach-V of MC Training to KIMO Sub-engineer and Gate Operator	On-site Training on Water Discharge Measurement for KIMO Staff (Civil Engineer & Sub-Engineer) at DTO-12 along R-II of MC	On-site Training on Water Discharge Measurement for KIMO Staff (Civil Engineer & Sub-Engineer) at DTO-12 along R-II of MC

3. Height-Quantity Curve (H-Q Curve) Calculation and Water Level Marking at Measuring Device

Applied Formula of H-Q curve (rating curve):

$$Q = C \times (H - a)^{n}$$

Where,

Q: Discharge (m3/s)

H: Reading water depth at the gauge of measuring devices (m)

C, n: Coefficient (decided based on water discharge measurement)

a: initial water level at gauge of measuring devices due to siltation or structure at downstream (m)

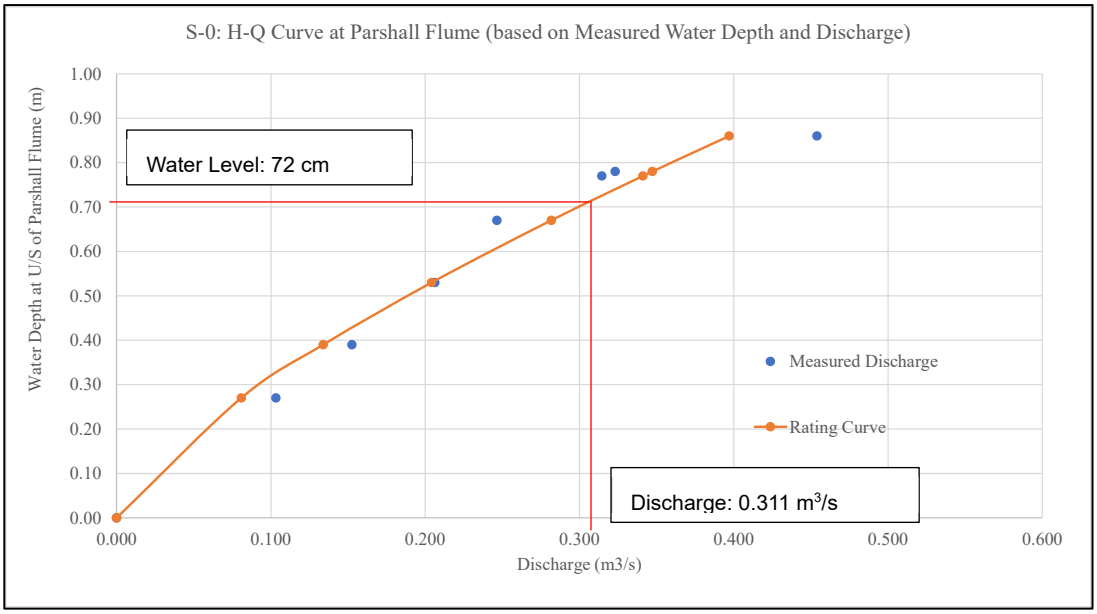


Figure 3.2-4 Sample of prepared H-Q curve

	
Marking of Discharge Water Level Discharge Water Level in Rainy Season at SC-0	Control of Water Discharge based on Marking Gate Operator and PF at SC-0

Others / Remarks	H-Q curve is presented in *Annex B Volume 3-6*.

Activity 14 / 39	**Installation, Calibration and Maintenance of Water Measuring Devices**		
Purpose	To install water measuring devices at missing point		
Expected Output	Water Measuring Devices will be installed		
Target Area	BPs of all SCs	**Schedule**	Nov. 2021 to June 2022
Contents of Activities			

1. Inventory Survey of Existing Measuring devices at BP of SC in December 2021

Condition of Installation of PF along SC (as of December 2021)

Phase-1 Area (S-0 to S-12)					Phase-2 (Extension) Area (S-13 to S-21)				
MC Reach	**SC**	**PF Installed**	**PF Not Installed**	**Remarks**	**MC Reach**	**SC**	**PF Installed**	**PF Not Installed**	**Remarks**
I	S-0		●		V	S-13		●	
I	S-1	●			V	S-14	●		
I	S-2	●			V	S-15	●		
I	S-3	●			V	S-16	●		
I	S-4	●			V	S-17		●	
II	S-5	●			V	S-18		●	
III	S-6	●			V	S-19		●	Concrete flume is constructed.
III	S-7	●			V	S-20		●	
III	S-8	●			V	S-21		●	
IV	S-9	●			**Sub-total**		**3**	**6**	
IV	S-10	●							
IV	S-11	●							
IV	S-12	●							
Sub-total		**12**	**1**		**Total**		**15**	**7**	

2. Design and Cost Estimate of PF

Design and Cost Estimate of PF (January 2022)

Nos.	Type of Flume (width of throat)	Canal	Nos. of PF	Cost Estimate*1) (Rs. /no.)	Amount (Rs.)	Remarks
1	9 inches	T-10 of SC-10 T-11 of SC-10 T-10 of SC-15 T-2 of SC-17	4	158,490	633,960	T-10 of SC-15: Constructed
2	1 feet	SC-18	1	190,105	190,105	-
3	1.5 feet	SC-0, SC-13 SC-19, SC-20 SC-21	5	215,823	1,079,115	SC-0: Constructed
4	2 feet	SC-17	1	226,448	226,448	Constructed
	Total		11	-	2,129,628	-

*Note: *1) Cost estimate is carried out in January 2022 and including 5% contingency.*

3. Construction of PF

Construction of PF

Nos.	Canal	Size	Status	Decision by KIMO
Original Schedule of Construction in FY2021-22				
1	T-10 of SC-10	9 inches	Not constructed	To be cancelled and H-Q curve will be developed in concrete lining section.
2	T-11 of SC-10	9 inches	Not constructed	
3	T-10 of SC-15	9 inches	Completed in FY2021-22	-
4	T-2 of SC-17	9 inches	Not constructed	To be cancelled and H-Q curve will be

				developed in concrete flume section.
5	SC-0	18 inch (1.5 feet)	Completed in FY2021-22	-
6	SC-17	24 inch (2 feet)	Completed in FY2021-22	-
Remaining PF (Not scheduled in FY2021-22)				
7	SC-13	18 inch (1.5 feet)	Design completed	To be cancelled and H-Q curve will be developed in canal section.
8	SC-18	12 inch (1 feet)	-ditto-	To be cancelled and H-Q curve will be developed in flume section
9	SC-19	18 inch (1.5 feet)	-ditto-	
10	SC-20	18 inch (1.5 feet)	-ditto-	
11	SC-21	18 inch (1.5 feet)	-ditto-	

Others / Remarks	N / A

Photos

Construction of PF in SC-0

Construction of PF in SC-0

Construction of PF in SC-0

Activity 15&16 / 39	**Implementation of water distribution and monitoring and evaluation**		
Purpose	1) To implement water distribution based on the water distribution plans 2) To implement monitoring and evaluation of water distribution		
Expected Output	Water distribution is implemented based on water distribution plan		
Target Area	MC to SCs: Whole scheme SC to TCs: 8 model SCs	**Schedule**	

Contents of Activities

1. Roles and Responsibilities of KIMO and WUA were confirmed as follows:

Distribution	Water Distribution Planning	Gate Operation	Monitoring
MC to SCs	WUA MCC / KIMO jointly	KIMO (Gate Operator)	WUA MCC / KIMO jointly
MC to DTOs	WUA MCC/KIMO jointly	KIMO (Gate Operator)	WUA MCC/KIMO jointly
MC to MC (I-II, I-V, II-III, II-IV)	WUA MCC/KIMO jointly	KIMO (Gate Operator)	WUA MCC/KIMO jointly
SC to TCs	Water Distribution Committee of SCC	Water Distribution Committee of SCC	WUA SCC

2. Water Distribution Schedule and Method were confirmed as follows:

Season	Period	Area	Irrigation Method from MC to SC
Monsoon	June 16 to Oct 30	Whole Area	1. Continuous flow from MC to SC 2. Distribution discharge is calculated based on the area of SC
Canal maintenance	Nov. 1 to Jan. 31	Stoppage of water	To concentrate annual maintenance and repair works for canal by KIMO
Winter & Spring	Feb. 1 to June 15	Cropping area for winter and spring crop in whole KIS area (Not alternate distribution)	1. Cropping plan (area, crop) will be submitted from MCC to KIMO 2. Water requirement will be calculated based on the cropping plan by KIMO 3. Distribution plan will be prepared by KIMO and agreed by WUA MCC

3. Training to KIMO Gate Operator on Water Distribution was conducted as follows:

Nos.	Item	Description
1	Date & Time	9th March 2024
2	Venue	Meeting Hall of WUA, Janta, Shivasatakshi, Jhapa
3	Objectives	1) To explain water distribution using water level mark 2) To discuss challenge in water distribution
4	Participants	1) KIMO Sub-Engineer 2) Chairman and Vice Chairman, Secretary of WUA MCC 3) KIMO Gate Operator Total 25 Nos.
5	Agenda and Summary of Results	**1. Water Distribution** a. To Explain the Gate Keeper about Water Distribution for Spring season 1) Distribute the water distribution plan prepared by Excel sheet to all participant and explain how to use water distribution plan 2) Participant was sharing their experience, for the equitable water distribution in whole the command area, first need to clean the SC and TC. 3) Clean canal will help to distribute the water easy way. In this SC is cleaned once a year but not a practice to clean the TC, as per their opinion head farmers are using more water that's why tail end farmer not getting the water, so water distribution manage within the SC by SCC committee. b. Water Distribution in Spring Season by Selected Gate Keeper The participants expressed their views and opinions regarding water distribution in the Spring season. Gate Keeper of SCC-4: • Head of Farmer's are taking more water. • Illegal outlets are placing in the canal. • Canal condition is not good, more seepage through the canal.

Gate Keeper of SCC-5:

- No problem in the SC-5 water reaches up to tail end.

Gate Keeper of SCC-6,7&8:

- Canal is not clean
- Canal size is small, so required discharge not passes through that section.

Gate Keeper of SCC-9:

- No problem in the SC-9 water reaches up to tail end.
- Canal length is not longer and most of section is lined.
- SCC chairperson is not active, do not clean the canal.

Gate Keeper of SCC-10,11&12:

- In 11 and 12 water is deficit due to canal is not clean.
- Canal condition is not good , seepage through the canal.
- SCC chairperson is not active ,do not clean the canal.

Gate Keeper of SCC-15&16:

- No problem in Sc-15 and 16

Gate Keeper of SCC-17,18,19,20&21:

- In 17,18,19,20 and 21 water is deficit. This is a tail end part of Reach -5

2. Suggestion remarks to gate keeper by Secretary of WUA, Mr Baburam Basnet

1) After releasing the water in the SC monitoring should be done by gate keeper.
2) For the water release in the canal do not follow the instruction of individual farmer request.
3) In most of SC, there is water distribution subcommittee, so follow the instruction of water distribution subcommittee.
4) Monitor the water distribution, If no crop water is wastage from any TC than close that gate.
5) If any farmer forcing to release the water in the canal (If no schedule), you can ask that farmer you talk with WUA because we are following the instruction of WUA.
6) Do not close the water in nighttime.
7) This year we are planning to deliver the water in whole the command area of KIS. Integration between agriculture and irrigation.

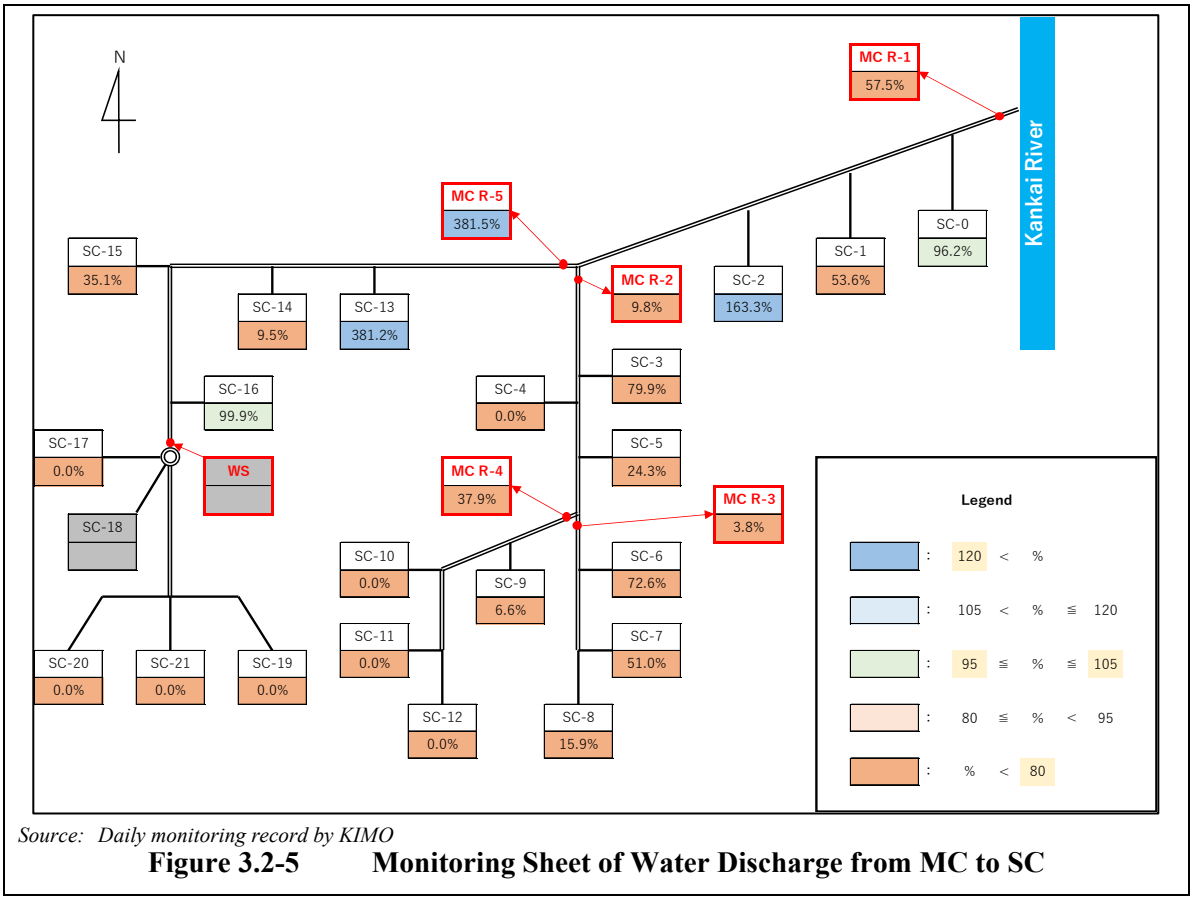
3. Conclusion:

1) Water Distribution spring season training is effective for the equitable water distribution; however impact can be evaluated after the implementation of the distribution plan.
2) Water release in the canal in night time.
3) Illegal outlets are remove from canal.
4) Gate keepers are understand about water level height for spring season.
5) As per water level height gate keeper deliver the water in the canal.
6) After releasing the water gate keeper should monitor the water distribution in SC.
7) Gate keeper does not follow the instruction of individual farmer. Follow the instruction of water distribution subcommittee.

	
Training Workshop to KIMO Gate Operator	Training Workshop to KIMO Gate Operator

4. Monitoring of Water Distribution was conducted

Water distribution was conducted using water discharge mark. Daily monitoring of water distribution discharge was conducted by the computer operator appointed by KIMO using the schematic monitoring sheet as follows:



Source: Daily monitoring record by KIMO

Figure 3.2-5 Monitoring Sheet of Water Discharge from MC to SC

3.2.2 Implementation of Appropriate Facility Maintenance

Activity 17 / 39	**Preparation of Irrigation Diagram for Irrigation Facility (Preparation of Irrigation Facility Ledger (IFL))**		
Purpose	To prepare / update base data for water distribution plan and facility maintenance plan		
Provided Output	IFL		
Target Area / Person	MCs, SCs, TCs and DTOs	**Work Period**	Since Mar. 2022

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	Preparation work - To prepare format of IFL[*1] through discussion among KIMO, WUA and JPT (Ref.: *Annex B Volume 4-1, IFL for MCs & SCs*) - To prepare survey sheet[*1] based on trial Walk Through Survey (WTS) (Ref.: *Annex B Volume 4-2, Format of survey sheet for MCs & SCs*)	KIMO, WUA, JPT	For MCs & SCs Feb - Mar. 2022 For TCs & DTOs[*4] Mar. – Apr. 2022 Mar. 2023
2	Implementation of WTS[*2] MCs: Conducted by KIMO and JPT. SCs: Conducted by WUA and JPT. TCs & DTOs: Conducted by WUA[*1]. (Survey method was instructed by KIMO and JPT.)	KIMO, WUA, JPT	For MCs & SCs Feb - Mar. 2022 For TCs & DTOs since Apr. 2023
3	Preparation for IFL MCs & SCs - To prepare IFL by QGIS / Google Earth and Excel. (Ref.: *Annex B Volume 4-1, IFL for MCs and SCs*) TCs & DTOs - Record of WTS is dealt as IFL. [*1] (Ref.: *Annex B Volume 4-3, Samples of IFL for TCs / DTOs*[*3])	MCs & SCs: JPT TCs & DTOs: WUA	For MCs & SCs Feb 2022 – July 2023 for draft (until Oct 2024 for finalization) For TCs & DTOs since Apr. 2023

Others / Remarks

*1: For WTS implementation and IFL preparation for TCs and DTOs, simple method and format were applied to consider its practicability and sustainability.
*2: Outline for method of WTS is shown in following Figure.
*3: As simple style of survey sheet and IFL, result of WTS was recorded in commercial notebook. Its copies were collected as much as possible, but it was difficult to collect all of them. As a sample of it, a copy is shown in the *Annex B Volume 4-3*.)
*4 At Stage-1, the preparation works was conducted. And it was modified in Stage-2 to consider its practicability and sustainability.

Photos

WTS for MC

WTS for SC (SC-1)

WTS for SC (SC-19)

Interview to WUA members (SC-5)

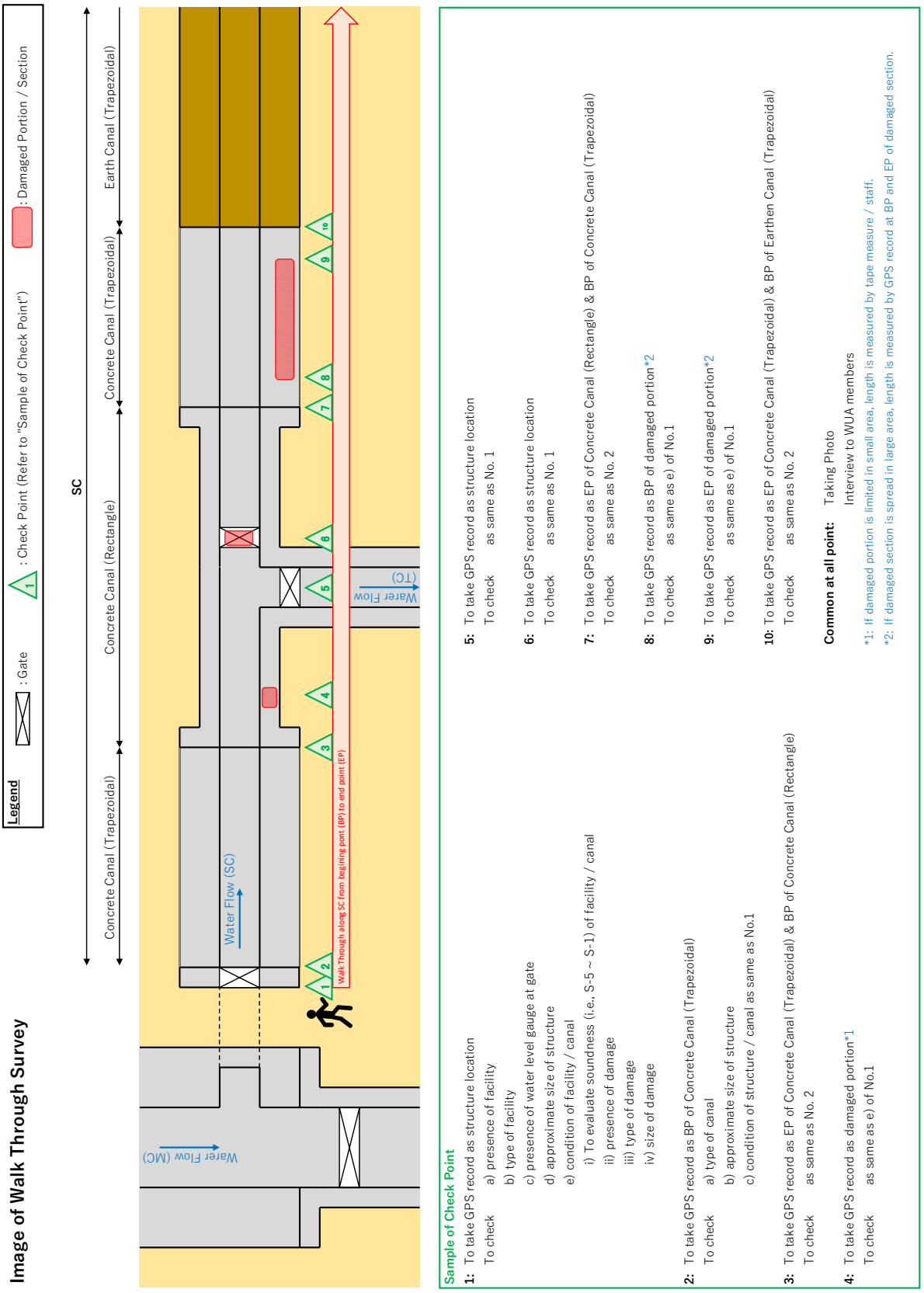
WTS for SC (SC-17)

WTS for SC (SC-9)

WTS for TC/DTO (TC-6 of SC-1)

WTS for TC/DTO (in SC-14)

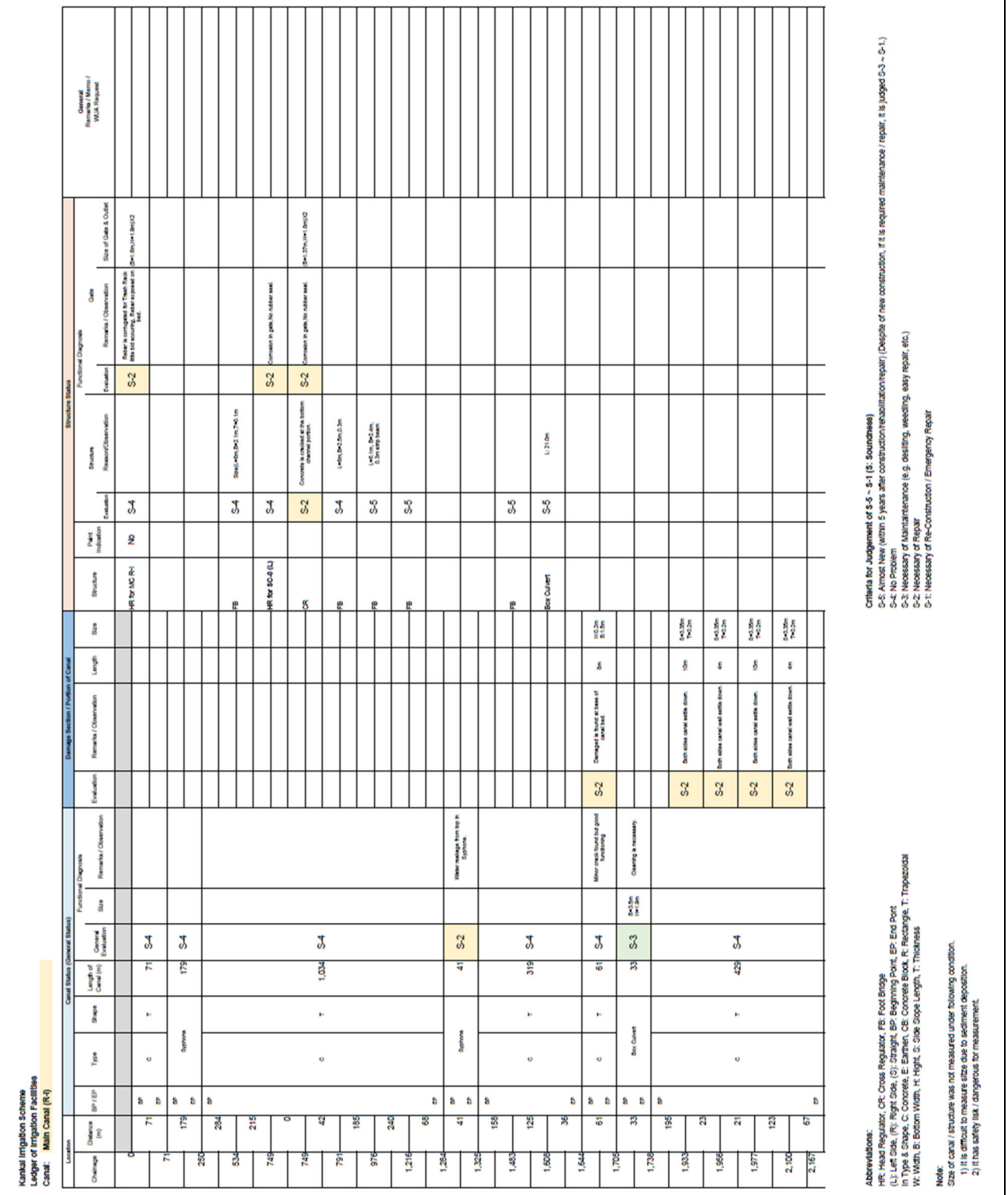
Sample of Output



Source: JICA Project Team

Figure 3.2-6 Outline of Method for WTS

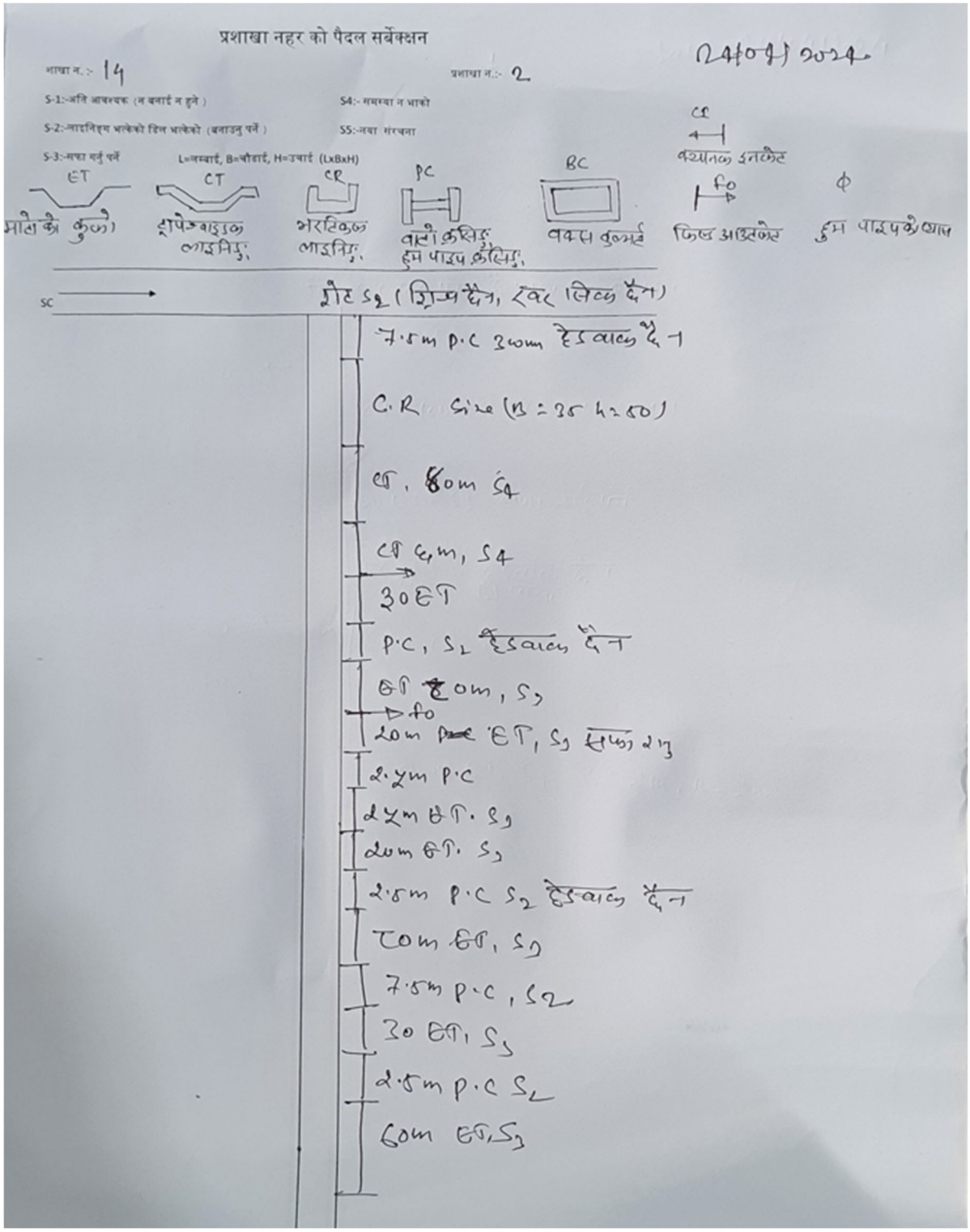
Sample of Output



Source: JICA Project Team

Figure 3.2-7 Sample of prepared IFL (MC)

Sample of Output



Source: JICA Project Team

Figure 3.2-8 Sample of Survey Sheet & IFL for TCs / DTOs (Simple Style)

Activity 18 / 39	**Evaluation of Irrigation Facility/Preparation of Annual Maintenance Plan**		
Purpose	To keep / recover functionality of irrigation facilities for equitable and sufficient water distribution		
Provided Output	Annual Maintenance Plan		
Target Area / Person	MCs, SCs, Model TCs and some TCs / DTOs in non-model SCs	**Work Period**	From Feb 2022 -

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	Preparation work - To determine evaluation criteria through i) discussion among KIMO, WUA and JPT and ii) trial WTS. - To prepare format of IFL through discussion among KIMO, WUA and JPT (together with Activity 17). - To prepare survey sheet based on trial WTS (together with Activity 17).	KIMO, WUA, JPT	For MCs & SCs Feb - Mar. 2022 For TCs & DTOs[*2] Mar. – Apr. 2022 Mar. 2023
2	Implementation of functional Diagnosis[*1] MCs: Conducted by KIMO and JPT. SCs: Conducted by WUA and JPT. TCs & DTOs: Conducted by WUA[*1]. (Survey method was instructed by KIMO and JPT.)	KIMO, WUA, JPT	For MCs & SCs Feb - Mar. 2022 For TCs & DTOs since Apr. 2023
3	Preparation for IFL MCs & SCs - To prepare IFL by QGIS / Google Earth and Excel. (Same with Activity 17.) TCs & DTOs - Record of WTS is dealt as IFL. (Same with Activity 17.)	MCs & SCs: JPT TCs & DTOs: WUA	For MCs & SCs Feb 2022 – July 2023 for draft (until Oct 2024 for finalization) For TCs & DTOs since Apr. 2023
4	Preparation of Annual Maintenance Plan MCs - JPT prepared Priority List for Repair and Maintenance based on IFL (Ref. *Annex B Volume 4-4*). - KIMO prepared Repair and Maintenance Plan based on Priority List. SCs - Workshop was held to prepare Maintenance Plan for SCs. (Ref. *Annex B Volume 4-5*) TCs & DTOs - Maintenance Plan was prepared by simple format. (Ref. *Annex B Volume 4-6*)	**MCs** KIMO & JPT **SCs** MCC & JPT: To facilitate the workshop SCC members: To consider the plan **TCs & DTOs** MCC & JPT: To instruct preparation method of the plan SCC members: To consider the plan	For MCs & SCs Since FY 2023/2024 For TCs & DTOs Since FY 2023/2024
5	Implementation of maintenance based on the plan.	**MCs:** KIMO **SCs:** SCCs **TCs & DTOs:** TCCs and DTOCs	ditto

Others / Remarks	*1: Functional Diagnosis was conducted together with WTS which is explained in Activity 17. *2: At Stage-1, the preparation works was conducted. And it was modified in Stage-2 to consider its practicability and sustainability.

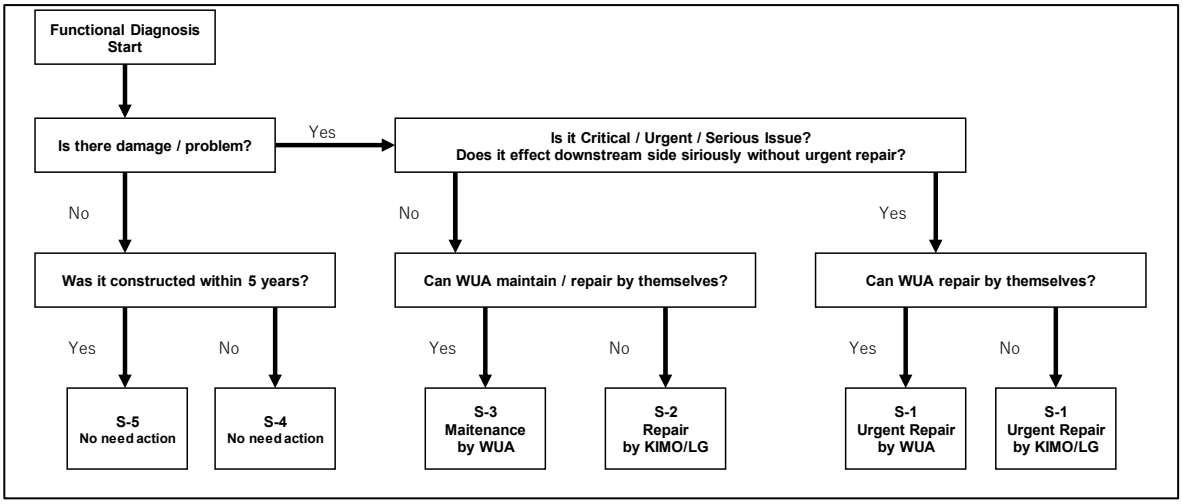
Photos	
	
Functional Diagnosis in WTS	Confirmation of damaged Portion
	
Confirmation of Current Condition of Irrigation Facility	Workshop for Maintenance Plan Preparation of Model SC
	
Workshop for Maintenance Plan Preparation of Non-model SC	Maintenance Plan Preparation for TC / DTO

Sample of Output

Table 3.2-2 Evaluation Criteria for Functional Diagnosis in Kankai

Level of Functionality	Evaluation Criteria
S-5	No Damage / Problem and Almost New (Within 5 years after construction / rehabilitation/repair)
S-4	No Damage / Problem
S-3	Necessary of Maintenance Desilting, weeding, easy repair, etc.: by WUA
S-2	Necessary of Repair Earth work (e.g., embankment repair): by KIMO/LG support Concrete work (e.g., concrete canal repair): by KIMO/LG support Metal work (e.g., gate repair): by KIMO/LG support
S-1	Necessary of Emergency / Critical Repair Earth work (e.g., embankment repair): by WUA or KIMO/LG support Concrete work (e.g., concrete canal repair): by KIMO/LG support Metal work (e.g., gate repair): by KIMO/LG support

Source: JICA Project Team



Source: JICA Project Team

Figure 3.2-9 Evaluation Flow Chart for Functional Diagnosis

Sample of Output

TCP-PIAT

Act. 18 Evaluation of Irrigation Facility[*1] / Preparation of Annual Maintenance Plan

Basic Policy of Maintenance / Repair / Improvement for Irrigation Facility

(1) In IMT (Principle Rule)

		Maintenance (i.e., Canal Cleaning)	Repair / Rehabilitation	Improvement
MCs	Budget	KIMO	KIMO	KIMO
	Implementation	KIMO	KIMO	KIMO
SCs	Budget	WUA	WUA	WUA
	Implementation	WUA	WUA	WUA
TCs	Budget	WUA	WUA	WUA
	Implementation	WUA	WUA	WUA
DTOs	Budget	WUA	WUA	WUA
	Implementation	WUA	WUA	WUA

(2) In Current Actual Condition

		Maintenance (i.e., Canal Cleaning)	Repair / Rehabilitation	Improvement
MCs	Budget	KIMO	KIMO	KIMO
	Implementation	KIMO	KIMO	KIMO
SCs	Budget	KIMO / WUA	KIMO	KIMO
	Implementation	KIMO / WUA	KIMO	KIMO
TCs[*2]	Budget	WUA	KIMO / WUA	KIMO / WUA
	Implementation	WUA	KIMO / WUA	KIMO / WUA
DTOs	Budget	WUA	KIMO / WUA	KIMO / WUA
	Implementation	WUA	KIMO / WUA	KIMO / WUA

(3) Supposition / Precondition for Preparation of Annual Maintenance Plan

		Maintenance (i.e., Canal Cleaning)	Repair / Rehabilitation	Improvement
MCs	Budget	KIMO	KIMO	KIMO
	Implementation	KIMO	KIMO	KIMO
SCs	Budget	SCC[*3]	SCC (+MCC)[*4*5]	SCC (+MCC)[*4*5]
	Implementation	SCC[*3]	SCC (+MCC)[*4*5]	SCC (+MCC)[*4*5]
TCs[*2]	Budget	SCC[*3]	SCC (+MCC)[*4*5]	SCC (+MCC)[*4*5]
	Implementation	SCC[*3]	SCC (+MCC)[*4*5]	SCC (+MCC)[*4*5]
DTOs[*2]	Budget	SCC[*3]	SCC (+MCC)[*4*5]	SCC (+MCC)[*4*5]
	Implementation	SCC[*3]	SCC (+MCC)[*4*5]	SCC (+MCC)[*4*5]

Note:

*1: "Irrigation Facility" means canal and related structures (e.g., gate, outlet, division box, etc.)

*2: Incuding On-farm Development (OFD) (i.e., division box, field outlet, etc.)

*3: Cleaning by procured mini-backhoe.

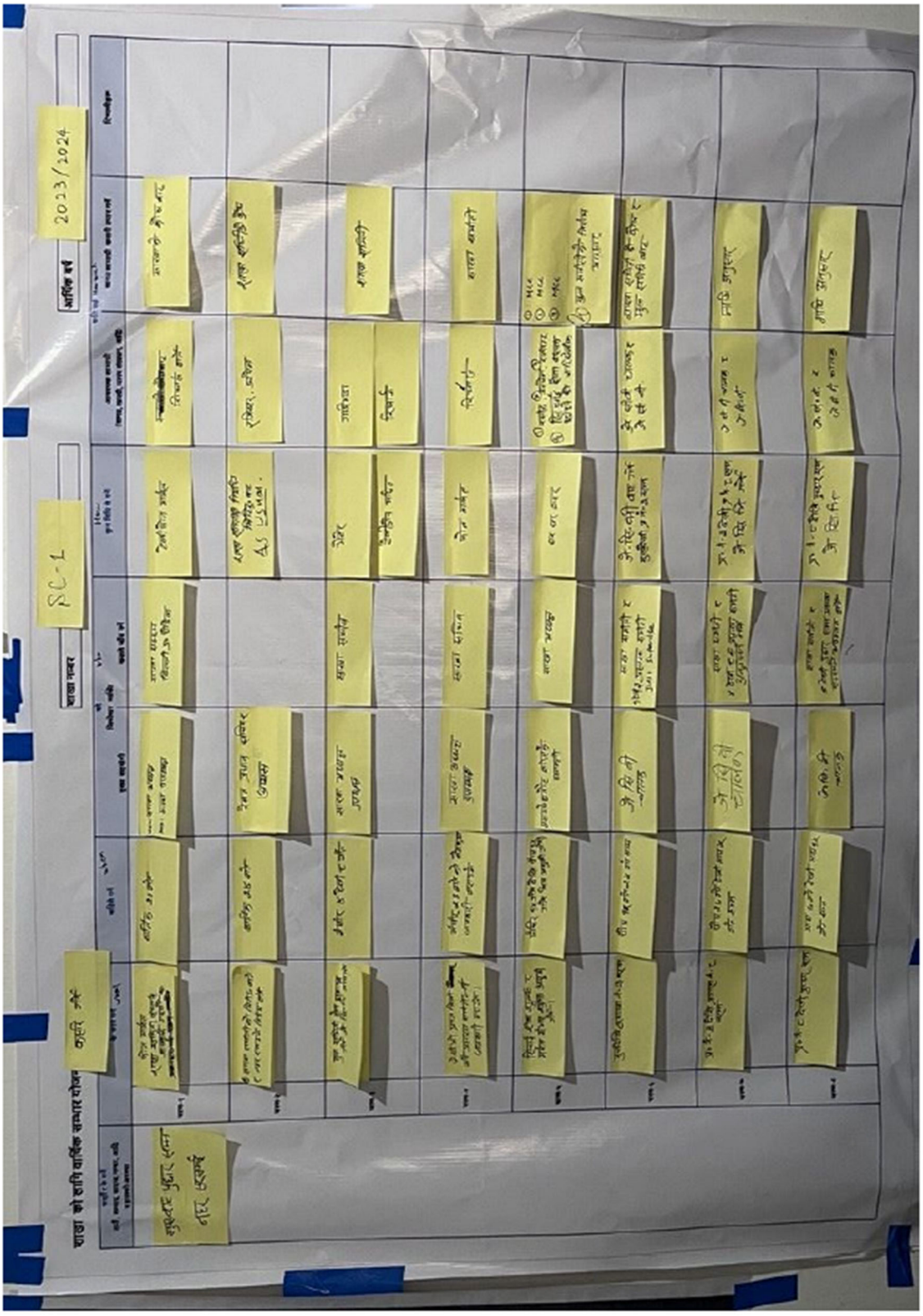
*4: If it is difficult for WUA technically and / or finacially, WUA will consult with KIMO and / or Local Governments (LGs).

*5: Basically, it shall be conducted and managed by SCC. But in case of *4, MCC will consult with KIMO and / or LGs.

Source: JICA Project Team

Figure 3.2-10 Confirmed Role & Responsibility for Maintenance

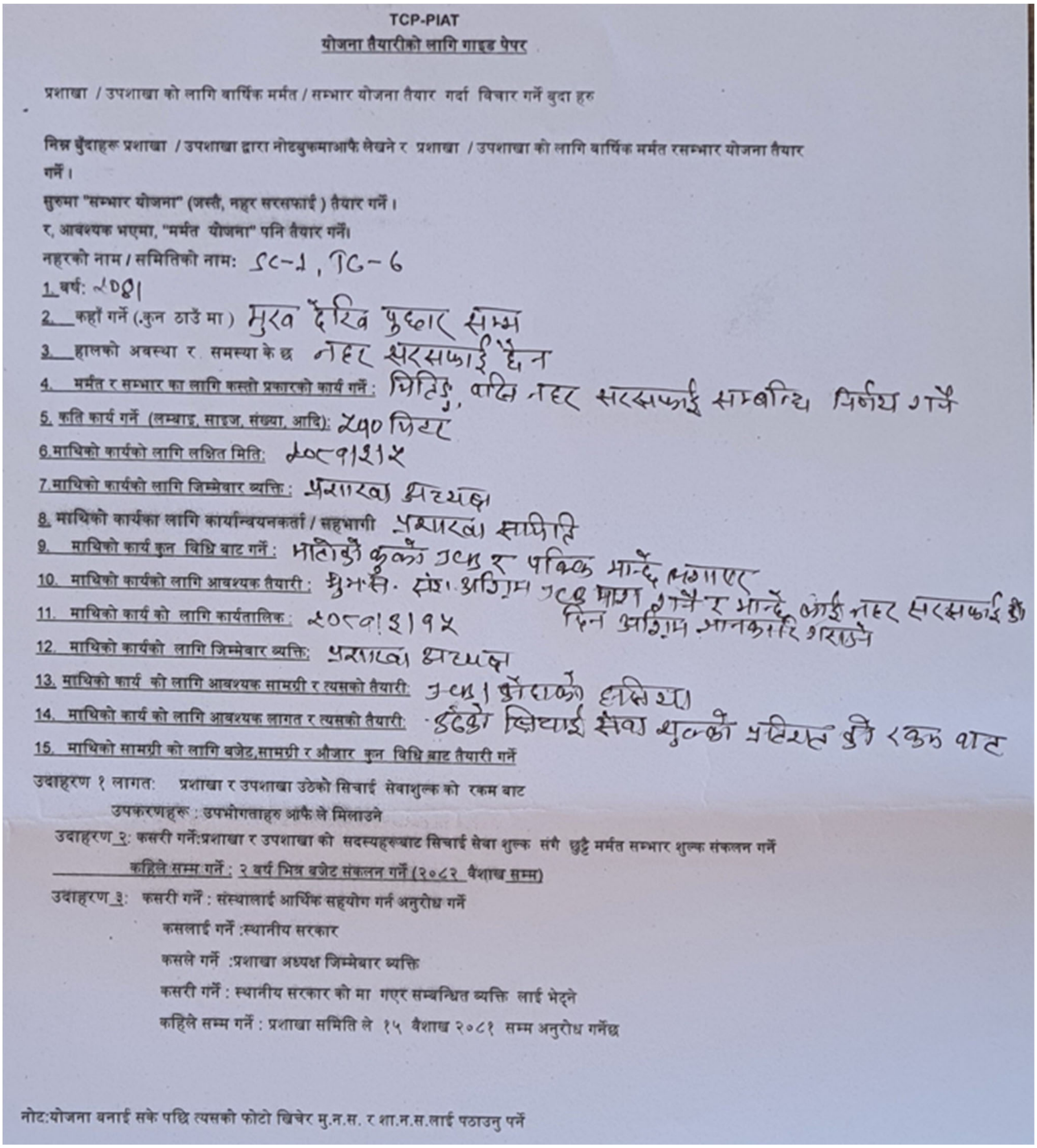
Sample of Output



Source: JICA Project Team

Figure 3.2-11 Sample of Prepared Maintenance Plan for Model SC

Sample of Output



TCP-PIAT

योजना तैयारीको लागि गाइड पेपर

प्रशाखा / उपशाखा को लागि वार्षिक मर्मत / सम्भार योजना तैयार गर्दा विचार गर्ने बुदा हरु

निम्न बुँदाहरू प्रशाखा / उपशाखा द्वारा नोटबुकमाआफै लेखने र प्रशाखा / उपशाखा को लागि वार्षिक मर्मत रसम्भार योजना तैयार गर्ने ।

सुरुमा "सम्भार योजना" (जस्तै, नहर सरसफाई) तैयार गर्ने ।

र, आवश्यक भएमा, "मर्मत योजना" पनि तैयार गर्ने।

नहरको नाम / समितिको नाम: SC-1, TC-6

1. वर्ष: २०८१

2. कहाँ गर्ने (.कुन ठाउँ मा) मुख देखि पुछार सम्म

3. हालको अवस्था र समस्या के छ नहर सरसफाई छैन

4. मर्मत र सम्भार का लागि कस्तो प्रकारको कार्य गर्ने : मिटिङ, बसि नहर सरसफाई सम्बन्धि निर्णय गर्ने

5. कति कार्य गर्ने (लम्बाइ, साइज, संख्या, आदि): २४० मिटर

6. माथिको कार्यको लागि लक्षित मिति: २०८१।२।१५

7. माथिको कार्यको लागि जिम्मेवार व्यक्ति : प्रशाखा अध्यक्ष

8. माथिको कार्यका लागि कार्यान्वयनकर्ता / सहभागी प्रशाखा समिति

9. माथिको कार्य कुन विधि बाट गर्ने : माटोको कुलो JCB र पक्कि मान्छे लगाएर

10. माथिको कार्यको लागि आवश्यक तैयारी : मु.न.स. संग अग्रिम JCB माग गर्ने र मान्छे लाई नहर सरसफाईको दिन अग्रिम जानकारि गराउने

11. माथिको कार्य को लागि कार्यतालिक : २०८१।३।१५

12. माथिको कार्यको लागि जिम्मेवार व्यक्ति: प्रशाखा अध्यक्ष

13. माथिको कार्य को लागि आवश्यक सामग्री र त्यसको तैयारी: JCB। मजदुरको व्यवस्था

14. माथिको कार्य को लागि आवश्यक लागत र त्यसको तैयारी: उठेको सिचाई सेवा शुल्कको प्रतिशत बुझे रकम बाट

15. माथिको सामग्री को लागि बजेट,सामग्री र औजार कुन विधि बाट तैयारी गर्ने

उदाहरण १ लागत: प्रशाखा र उपशाखा उठेको सिचाई सेवाशुल्क को रकम बाट

उपकरणहरू : उपभोगताहरु आफै ले मिलाउने

उदाहरण २: कसरी गर्ने:प्रशाखा र उपशाखा को सदस्यहरुबाट सिचाई सेवा शुल्क संगै छुट्टै मर्मत सम्भार शुल्क संकलन गर्ने

कहिले सम्म गर्ने : २ वर्ष भित्र बजेट संकलन गर्ने (२०८२ वैशाख सम्म)

उदाहरण ३: कसरी गर्ने : संस्थालाई आर्थिक सहयोग गर्न अनुरोध गर्ने

कसलाई गर्ने :स्थानीय सरकार

कसले गर्ने :प्रशाखा अध्यक्ष जिम्मेवार व्यक्ति

कसरी गर्ने : स्थानीय सरकार को मा गएर सम्बन्धित व्यक्ति लाई भेट्ने

कहिले सम्म गर्ने : प्रशाखा समिति ले १५ वैशाख २०८१ सम्म अनुरोध गर्नेछ

नोट:योजना बनाई सके पछि त्यसको फोटो खिचेर मु.न.स. र शा.न.स.लाई पठाउनु पर्ने

Source: JICA Project Team

Figure 3.2-12 Sample of Prepared Maintenance Plan for TC (TC-6, SC-1) (Simple Style)

Activity 19, 20 / 39	**Improvement of ISF Collection System Support to WUA to Improve ISF Collection and Information Management**		
Purpose	To improve ISF collection system (Act. 19) To support WUA to improve ISF collection and data management (Act. 20)		
Expected Output	(i) Review report on ISF collection, (ii) Detail action plan for the improvement of ISF collection, (iii) Manually updated master list, (iv) Digital WUA accounting system, (v) Improvement of ISF collection rate		
Target Area / Person	Whole area of KIS / WUA members	**Schedule**	**Review of ISF collection system:** FY 2022 **Workshop for improvement of ISF collection:** FY 2022 **1st ISF collection**: Up to end of FY 2022/2023 **2nd ISF collection**: Up to end of FY 2023/2024

Works

Step	Activity	Implementor / Related Person	Implemented Period
1	To review the ISF collection system in collaboration with WUA	**WUA**: provided the information and data regarding ISF collection **JPT**: reviewed the current ISF collection system and proposed for the improvement.	Feb. 2022 to Feb. 2023
2	To support WUA in organizing the workshop to prepare action plan for the improvement of ISF collection (The workshop was originally planned in May 2022 but postponed due to delay in WUA election as well as Nepal General Election.)	**WUA and KIMO**: organized the workshop to improve the ISF collection **JPT**: facilitated the workshop to prepare the action plan by the participants.	Feb. 2022 to Feb. 2023
3	To update draft master list and make decision of ISF collection methods for FY 2022/23, FY 2023/24 (Due to the delay in the list update and software development, ISF collection of FY 2022/23 was conducted by conventional method) (Ref: *Annex B Volume 5-1, Sample Record of Master List Updated and Cadastral Map*)	**WUA:** understood the procedure of master list preparation and its result, and updated the draft mater list prepared by JPT **JPT:** prepared explanation note for master list preparation and provided field trainings to update the list.	April 2023 to Dec. 2023
4	To discuss water users list and concluded master list to be utilized for FY 2023/24 ISF collection among WUA, KIMO and JPT.	**WUA:** judged the updated master list to be utilized for next ISF collection and announced the decision to all WUA members. **KIMO and JPT**: provided an explanation and had a discussion as necessary.	Dec. 2023
5	To discuss the schedule of the next ISF collection and conduct training. (ISF collection training was conducted in Mar. 2024) (Ref: *Annex B Volume 5-2, Workshop Material and Report for ISF Collection Campaign*)	**WUA:** discussed the schedule of next ISF collection and inform to all WUA members. **KIMO**: conducted ISF collection training. **JPT**: monitored the progress.	Dec. 2023 to Mar. 2024
6	To conduct ISF collection and ISF collection campaign (ISF Collection Sub-committee under	**WUA:** collected ISF and related documents, and informed the ISF collection result to all concerned	Mar. 2024 to Sep. 2024

	MCC WUA has been formed in the chairmanship of, Secretary of MCC WUA to strengthen ISF collection monitoring and follow-up)	party. **KIMO and JPT**: monitored the progress.	
7	To input data in the ISF software	**WUA:** understood the function of the software, and input ISF collection data into the software. **KIMO and JPT**: provided an explanation and have a discussion as necessary.	Sep. 2024 to Jan. 2025

Others / Remarks	After the overseas training in Japan in 2023, WUA decided to change ISF unit rate as follows: <Before> NPR 450/ha/season (rainy and spring): In rainy season, all SCCs are subject to pay, and in spring season, water users receiving rotation irrigation are subject to pay. <After> NPR 740/ha/year: All water users shall pay the ISF based on the new unit rate.

Photos

Master List Update Training (SC 3), 17 May 2023

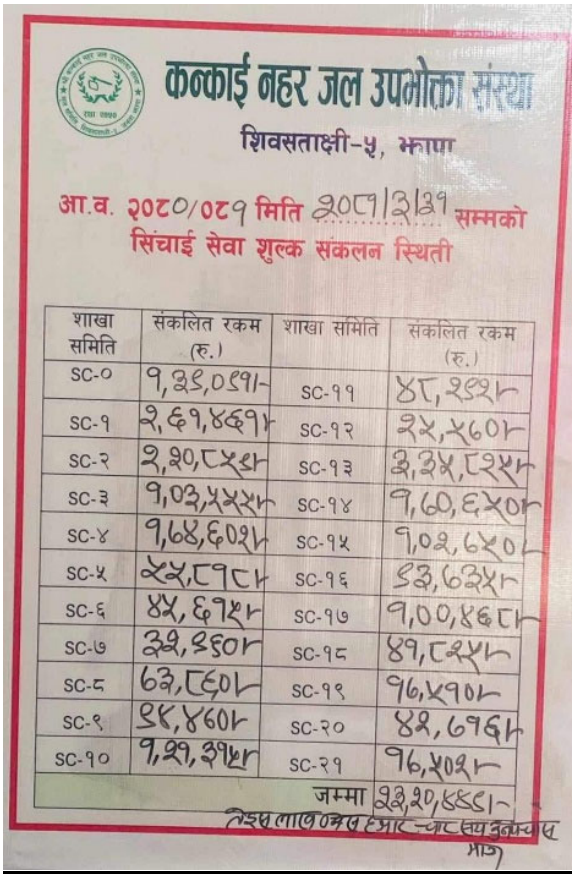
Workshop for Commencement of ISF Collection / Canal Protection Campaign (22 Jan. 2024)

ISF Collection Training to SC7&8 at MCC office (21 Mar. 2024)

ISF Collection 2023/24 is going on at SC 4 (Apr. 2024)

Meeting of ISF Collection Sub-Committee (5 May 2024)

Bannar posting in each SCC for ISF Collection Campaign



कन्काई नहर जल उपभोक्ता संस्था

शिवसताक्षी-५, झापा

आ.व. २०८०/०८१ मिति २०८१/३/३१ सम्मको

सिंचाई सेवा शुल्क संकलन स्थिती

शाखा समिति	संकलित रकम (रु.)	शाखा समिति	संकलित रकम (रु.)
SC-०	१,३९,०९१/-	SC-११	४८,२९२/-
SC-१	२,६१,४६१/-	SC-१२	२५,५६०/-
SC-२	२,२०,८५१/-	SC-१३	३,३५,८२५/-
SC-३	१,०३,५२५/-	SC-१४	१,६०,६५०/-
SC-४	१,६४,६०१/-	SC-१५	१,०२,६५०/-
SC-५	५५,८१८/-	SC-१६	९३,६३५/-
SC-६	४५,६१५/-	SC-१७	१,००,४६८/-
SC-७	३१,९६०/-	SC-१८	४१,८२५/-
SC-८	६३,८६०/-	SC-१९	१६,५१०/-
SC-९	९४,४६०/-	SC-२०	४२,६१६/-
SC-१०	१,२१,३१५/-	SC-२१	१६,५०२/-
		जम्मा	२३,२०,४४८/-

ISF Monitoring Board at MCC/WUA Office

Activity 21 / 39	**Training to WUA for Maintenance of Existing Irrigation Facility**		
Purpose	Ensure continuity of routine canal maintenance by WUA		
Expected Output	(i) WUA rules for routine maintenance of SC and TCs, (ii) Routine maintenance of TC by TCC/DTO members, (iii) Routine maintenance of SC by SCC members (iv) Capacity development of WUA in canal maintenance (v) Awareness raising campaign on canal protection by WUA		
Target Area / Person	Whole area of KIS / WUA members	**Schedule**	As bellow

Works

Step	Activity	Implementor / Related Person	Implemented Period
A-1	To establish WUA's rules for routine maintenance of TCs and SCs through discussion by WUA members at workshop (conducted on 22nd Jan. 2024 with 47 participants)	**WUA:** discussed rules of routine maintenance of TC and SCs by WUA. **JPT:** facilitated the workshop to establish rules of routine maintenance of canals.	Jan. 2024
A-2	To implement routine maintenance of TCs by TCC/DTOC according to the schedule decided at the workshop (A-1).	**WUA:** cleaned TC by TCC/DTOC members. **KIMO:** made necessary arrangements for routine maintenance of TC by WUA initiative. **JPT:** followed up the activity in model TCC/DTOC.	Feb. 2024 to Jun. 2024 (before the commencement of rainy irrigation)
A-3	To implement routine maintenance of SCs by SCC according to the schedule decided at the workshop (A-1).	**WUA:** cleaned SC by SCC members. **KIMO:** made necessary arrangements for routine maintenance of SC by WUA initiative. **JPT:** followed up the activity in model SCs.	Feb. 2024 to Jun. 2024 (before the commencement of rainy irrigation)
B-1	To organize training for canal maintenance <Classroom Training: 22nd Jan. 2024> 41 participants from MCC/SCC representative <On-site Training Group 1: 29 Feb 2024> 15 participants from SCC representative, Construction site of TC-6, SC-20 < On-site Training Group 2: 11 May 2024> 17 participants from SCC representative Construction site of SC-5 (Ref: *Annex B Volume 4-7, Report on On-site Training for Canal Maintenance*)	**JPT:** conducted classroom training and on-site training for canal maintenance based on the request of WUA at the workshop (A-1). **WUA / KIMO:** fix the detail of field trainings at construction site (date, time. venue, participants, etc.).	Feb. to Jun. 2024 (before the commencement of rainy irrigation)
C-1	To conduct awareness raising campaign as follows: -establishment of notice board indicating appropriate canal use (Ref: *Annex B Volume 4-8, Notice Board*) -classroom lecture at local school (Ref: *Annex B Volume 4-9, Material and Report on Lecture at Local School*) -regular posting of canal cleaning activity in WUA Facebook	**WUA**: took initiative of the campaign and coordinated with LGs for organizing of campaign **LGs**: coordinated with WUA and provided financial support **JPT**: provided necessary assistance if necessary	Feb. to Sep. 2024

Others / Remarks	1. WUA's rules for routine maintenance of TCs and SCs was set to be two times before rainy & spring cultivation. 2. After the overseas training in 2023, the four municipalities concerned have actively provided financial support to WUA for canal protection campaign and other supporting activities. 3. In 2024, canal cleaning before rainy season were often observed in many places in KIS, better than before 2024, which would be positive impact by the Project activity.

Photos

Canal Cleaning with PMEP* funds in Kamal Municipality (Uploaded to Facebook on 3 Apr. 2024)
*) Prime Minister Employment Program

Workshop for Canal Protection Campaign and Classroom Training (22 Jan. 2024)

On-site Training to WUA for Maintenance of Existing Irrigation Facility (11 May 2024)

School Lecture for Canal Protection Campaign (21 Jun.2024)

Notice Board for ISF Collection and Canal Protection Campaign established by Shivasatakshi Mun.

Activity 22 / 39	**Repair of Existing Irrigation Facility with Budget of KIMO, Rural Government & WUA*1**		
Purpose	To keep / improve water flow and distribution by repair of irrigation facilities		
Provided Output	Repaired Irrigation Facility		
Target Area / Person	Whole area of KIS	**Work Period*1**	Since FY 2021/2022

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	Preparation work*2. - To conduct planning and designing for repair works - To estimate necessary costs for repair	KIMO	Roughly between May – July in each FY
2	Budgeting for repair work. - To apply annual budget to MOWSIE - To apply annual budget to MOEWRI / DWRI (for large scale works)	KIMO	Ditto
3	Implementation of repair work. - To procure Contractors - To supervise Contractors	KIMO	In dry season in each FY

Others / Remarks	*1: During the Project's period, repair work based on Rural Government & WUA was not observed. *2: From FY 2023/2024, Priority List, which was prepared in Activity 18, was used for the planning. Basically, this activity was conducted by KIMO themselves. JPT only provided some technical advice when it was required by KIMO.

Photos

Repair of Headworks
Condition before Repair

Repair of Headworks
Dewatering at Upstream of Scouring Gate

Repair of Headworks
Desilting & Cleaning

Repair of Headworks
Chipping Work at Under Sluice

Repair of Headworks
Concrete Casting at Upstream of Scouring Gate

Repair of Headworks
Concrete Casting at Shoot

Protection Works of Siphon

Repair of MC

Repair of MC

Repair of SC

Repair of Site Office

Construction of Custom Hiring Service Center (CHSC) Shed

Sample of Output

Table 3.2-3 Construction Works by KIMO's Budget

F/Y	Works	Budget (Mil. NPR)
2021/2022	Construction works of headworks, MC, SC, CHSC, OFD	120
2022/2023	Construction works of headworks, MC, SC, OFD	130
2023/2024	Construction works of headworks, MC, SC, Revetment, Road, etc.	65
2024/2025	Construction works of headworks, MC, SC, Revetment, etc.	72
	Total	**387**

Source: JICA Project Team based on Interview with KIMO

3.2.3 OFD in Model Site including FC Construction etc.

Activity 23 / 39 (1/2)	**Survey and Design for Division Box and FC & Support for Construction by KIMO and WUA** 1/2: for OFD including Division Box		
Purpose	1. To improve irrigation efficiency on farm level 2. To transfer technical knowledge of OFD works to KIMO/WUA		
Provided Output	Facilities of OFD		
Target Area / Person	Model & Replication Sites	**Work Period**	Since FY 2021/2022

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	Preparation work. - To select model / replication site - To hold General Meetings with related parties*1 - To conduct Site Visit to other model sites*1	LG, WUA, KIMO, JPT	Roughly between May – July in each FY
2	Planning and Designing - To conduct Joint Site Inspection with WUA, KIMO and JPT - To plan and design for OFD (Ref. *Annex B Volume 6-1 Samples of Standard Drawings for OFD*) - To select and procure contractors*2	WUA, KIMO, JPT	Roughly between July – Oct in each FY
3	Construction work for OFD. - To conduct construction work for OFD - To supervise construction work for OFD	KIMO, Contractor, WUA, JPT	In dry season in each FY

Others / Remarks	*1: These were conducted in 2nd model sites based on experience of 1st model sites. *2: In case of Kankai, KIMO procured WUA (MCC) as a contractor. And WUA (MCC) conducted construction work together with local contractors (sub-contractors).

Photos

Joint Site Inspection 1st Model Site (TC-6, SC-1)

General Meeting 2nd Model Site (TC-3 & 4, SC-7)

Site Visit to 1st Model Site (for 2nd Model Sites)
Explanation of Division Box and FC

Joint Site Inspection
2nd Model Site (SCC-4, TCC-11 & 12)

Topographical Survey by KIMO
1st Model Site, Canal Profile Survey

Topographical Survey by KIMO
1st Model Site, Canal Profile Survey

Construction Supervision by KIMO & JPT

Construction Supervision by KIMO & JPT

Constructed Division Box

Constructed Field Outlet with Road Crossing

Constructed Concrete Flume Canal in TC

Constructed Concrete Lining of TC

Sample of Output

Table 3.2-4 Constructed / Improved OFD Structure

Summary for Result of OFD in TCP-PIAT (as of end of Sept 2024) (except Field Channel)

Category	SCC	TCC/ DTOC	Constructed / Improved Facility	Specification / Explanation
1st Model Site	1	6	Canal Lining for TC	4 sections, Total L=95m, Rectangle
			Field Outlet	2 nos.
	10		Field Outlet	2 nos.
			Canal Lining for TC with Foot Bridge	1 section, L=72m, Rectangle, Width of Foot Bridge: 2m
			Canal Lining for TC	1 section, L=30m, Trapezoidal
	10		Rehabilitation of Field Outlet	1 nos
		11	Extension of Pipe Culvert for Road Crossing	1 nos, 2.5m (1 pipe) extention, HP dia 300mm
			Division Box	2 nos.
			Canal Lining for FC	1 section, L=15m, Rectangle, At curve portion,
		10	Extension of Pipe Culvert for Road Crossing	1 nos, 2.5m (1 pipe) extention, HP dia 300mm
			Canal Lining for TC	1 section, L=18m, Trapezoidal
	15		Road crossing (Hume pipe existing) additional 3 Hume pipe (3X300mm)	2nos.HP Dia 300mm
		11	Canal Lining for FC	1 section, Length 8m, Rectangle
			Canal Lining for TC	1 section, L=20m, Trapezoidal
	17		Field Outlet	6 nos.
			Pipe Culvert for tractor crossing	4 nos., HP dia 300mm
		2	Pipe Culvert for Foot Pass	4 nos., HP dia 300mm
			Pipe Culvert for Road Crossing	1 nos., HP dia 300mm
			Canal Lining for TC	1 section, L=240m, Trapezoidal
2nd Model Site	4		Field Outlet	8 nos
			Pipe Culvert for Road Crossing	6 nos. HP dia 300mm
		11, 12	Canal Lining for TC	6 sections, Total L=60m, Trapezoidal
			Division Box	3 nos
			Causeway	1 nos
	7		Field Outlet	5 nos.
		3, 4	Pipe Culvert for Road Crossing	1 nos., HP dia 300mm, 5.0m (2 pipes)
			Pipe Culvert for Road Crossing (on Field Channel)	3 nos., HP dia 300mm, 5.0m (2 pipes) x 3 nos
	14	1, 2	Field Outlet	1 nos
			Canal Lining for TC	3 sections, Total L=135m, Trapezoidal
Replication Site	10	1, 2, 3 TB-8	Field Outlet	3 nos.
			Pipe Culvert for Road Crossing	2 nos., HP dia 300mm, 5.0m (2 pipes) x 2 nos
			Canal Lining for TC	2 sections, Total L=110m, Trapezoidal
	17	TE-23	Field Outlet	4 nos
			Pipe Culvert for Road Crossing	3 nos., HP dia 300mm, 5.0m (2 pipes) x 3 nos
			Canal Lining for TC	1 section, L=100m, Trapezoidal
	8	5, 6	Pipe Culvert for Road Crossing	2 nos., HP dia 300mm, 5.0m (2 pipes) x 2 nos
			Canal Lining for TC	1 section, L=97m, Trapezoidal

Source: JICA Project Team

Activity 23 / 39 (2/2)	**Survey and Design for Division Box and FC & Support for Construction by KIMO and WUA** 2/2: for FC		
Purpose	1. To improve irrigation efficiency on farm level 2. To transfer technical knowledge of OFD works to KIMO/WUA		
Provided Output	Constructed FC (12.4 km)		
Target Area / Person	Selected Model & Replication Sites	**Work Period**	The activities became full-fledged since June 2023.

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	Preparation work. - To select model / replication site - To hold General Meetings with related parties*1 - To conduct Site Visit to other model sites*1	LG, WUA, KIMO, JPT	Roughly between May – July in each FY
2	Planning and Designing - To conduct Joint Site Inspection with WUA, KIMO and JPT - To plan for FC	WUA, KIMO, JPT	Roughly between July – Oct in each FY
3	Construction work for FC. - To conduct construction work for FC (Ref. *Annex B Volume 6-2, List of Constructed FCs*) (Ref. *Annex B Volume 6-3, Location Data of Constructed FCs*)	Main: WUA Support: KIMO & JPT	Before each cropping season.

Others / Remarks | *1: These were conducted in 2nd model sites based on experience of 1st model sites.

Photos

FC Construction by WUA

FC Construction by WUA

Constructed FC

Improved Water Distribution by FC

Improved Water Distribution by FC

Water Intake from FC to Farm Plot

Sample of Output

Table 3.2-5 List of Constructed FCs (Sample)

TC location and length of FC in Sc-1

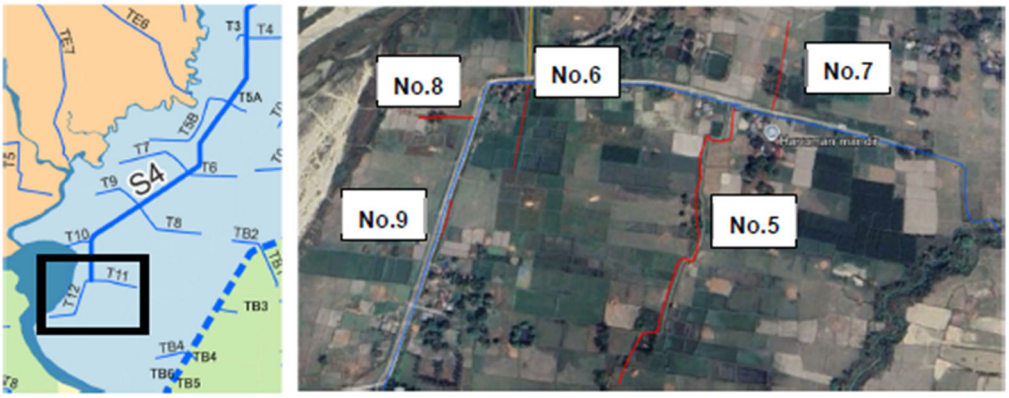
SCC Name	Tertiary	FC length	Northing	Easting
SC-1	TC-6	200	2943017.57	583229.76
SC-1	TC-6	80	2943113.00	583407.00
SC-1	TC-6	275	2943210.31	583590.88
SC-1	TC-6	100	2943109.11	583636.95
Total Length Of Field channel		**655**		

Source: JICA Project Team

Result of Field Channel Construction (as of end of Sept. 2024)

No.: 1, 2, 3, 4 Municipality: Shivasatakshi SCC: 1 TC / DTO: 6

No.: 5, 6, 7, 8, 9 Municipality: Shivasatakshi SCC: 4 TC / DTO: 11, 12



No.: 10 Municipality: Shivasatakshi SCC: 4 TC / DTO: 1

Source: JICA Project Team

Figure 3.2-13 Location Data of Constructed FCs (Sample)

Activity 24 / 39	**Land Levelling**		
Purpose	1 To improve irrigation efficiency on farm level, 2 To increase the work efficiency of farming activity by expanding of plot size		
Provided Output	Land levelled farm plot		
Target Area / Person	Demonstration Farm Plot Promoted Farm Plot	**Work Period**	Since Feb. 2022

Detail Activities

Step	Activities	Implementor / Related Person	Implemented Period
1	Procurement of Laser Land Leveler and Tractor - To consider necessary specifications for the machine. - To prepare MOU for utilization, operation and management for machines among related parties. (Ref. *Annex B Volume 6-4, MOU for Procurement Heavy Equipment*) - To procure the machines	JICA, WUA, KIMO, JPT	Feb. – Aug. 2022
2	Demonstration of Land Leveling - To consider policy and method of the demonstration for land leveling. - To conduct the demonstration of land leveling to confirm its effectiveness.	AKC, WUA, KIMO, JPT	In spring paddy cropping in 2023
3	Promotion of Land Leveling - To promote land leveling in KIS.	AKC, WUA, KIMO, JPT	After above

Others / Remarks	N / A

Photos

Procured Tractor

Procured Laser Land Leveler

Land Leveling

Land Leveling

Handing Over Ceremony for Procured Machines

Land Leveled Farm Plot

Sample of Output

Table 3.2-6 Result of Demonstration for Land Levelling (Yield)

Plot	Non levelled Plot Yield (t/ha) (A)	Levelled Plot Yield (t/ha) (B)	Difference Yield (t/ha) (C) = (B) – (A)	Change Ratio (D) = (B) / (A)
In SCC-4	5.76	6.12	+ 0.36	106%
In SCC-15	3.00	3.60	+ 0.60	120%

Source: JICA Project Team

Table 3.2-7 Result of Demonstration for Land Levelling (Flatness)

Plot	Max. Elevation of Plot (m) (A)	Min. Elevation of Plot (m) (B)	Difference Elevation of Plot (m) (C) = (A) – (B)	Average Elevation of Plot (m) (D)	Standard Deviation of Elevation (E)
In SCC-4 without Levelling	1.610 m	1.473 m	0.137 m	1.553 m	0.049
In SCC-4 with Levelling	1.470 m	1.423 m	0.047 m	1.443 m	0.015
In SCC-10 without Levelling	1.843 m	1.732 m	0.111 m	1.772 m	0.037
In SCC-10 with Levelling	1.595 m	1.560 m	0.035 m	1.577 m	0.010

Source: JICA Project Team

3.3 Output 3: Practice of Market-Oriented Agriculture

Activity 25 & 40-1	**Training of Trainers (TOT) in CAP Approach for Extension Technicians and Leader Farmers**		
Purpose	To make the extension technicians and the leader farmers understand the CAP approach and practice them in their fields		
Expected Output	A draft action plan of the major activities in each municipality		
Target Area / Person	1) Agriculture extension technicians from 4 LGs 2) Leader farmers from 8 model sites. (1st and 2nd stages)	**Work Period**	Stage-1: Nov 2021 to Sep 2023 Stage-2: Nov 2022 to Sep 2024

Activity Results

1. Stage-1

Step	Activity	Main Implementor	Implemented Period
1	Introduction of CAP approach to vegetable cultivation and marketing Experience sharing and technical training in vegetable cultivation and marketing	**JPT**: to plan, implement, and follow up the training **AKC and Municipality**: to participate in and support the training	Dec 2021 - Jun 2022 Nov 2022 - Jun 2023
2	Introduction of CAP approach to rice cultivation Experience sharing and technical training on rice cultivation, collaboration with Chandradangi Agriculture Development Farm (CADF) and Nepal Krishi Care (NKC)	**CADF and JPT**: to plan, implement, and follow up the training **AKC and Municipality**: to participate in and support the training	Mar - Oct 2022 Feb - Jul 2023
3	Introduction of CAP approach to rice marketing Experience sharing and technical training on rice marketing, collaboration with a rice mill	**JPT**: to plan, implement, and follow up the training **Municipality**: to participate in and support the training	Mar – Oct 2022 Feb -Jul 2023

2. Stage-2

Step	Activity	Main Implementor	Implemented Period
1	Review of CAP approach to vegetable cultivation and marketing Experience sharing and technical training in vegetable cultivation and marketing	**AKC and Municipality**: to plan, implement, and follow up the training **JPT**: to participate in and support the training	Mar - Jun 2023 Nov 2023 - Jun 2024
2	Review of CAP approach to rice cultivation Experience sharing and technical training on rice cultivation, collaboration with NKC	**AKC and Municipality**: to plan, implement, and follow up the training **CADF and JPT**: to participate in and support the training	Mar - Oct 2023 Feb - Jul 2024
3	Review of CAP approach to rice marketing Experience sharing and technical training on rice marketing, collaboration with a rice mill	**Municipality**: to plan, implement, and follow up the training **JPT**: to participate in and support the training	Mar - Oct 2023 Feb -Jul 2024

Others / Remarks	N / A

Photos

TOT Workshop on CAP Approach - 1

TOT Workshop on CAP Approach - 2

Technical Training on Spring Rice Cultivation - 1

Technical Training on Spring Rice Cultivation - 2

Plant Protection Training - 1

Plant Protection Training - 2

Vegetable Seed Handover Ceremony in Gauriganj - 1

Vegetable Seed Handover Ceremony in Gauriganj - 2

Leader Farmers Training at Birtamod Farm

Leader Farmers Training at Mama-Bhanja Farm

Recapping CAP Meeting in Gauradaha Office - 1

Recapping CAP Meeting in Gauradaha Office – 2

Sample of Output

Technical Cooperation Project for the Promotion of Irrigated Agriculture in Terai Plain(TCP-PIAT)
Draft Action Plan of Agriculture Technicians after Completion of TOT in September 28 – 30, 2021

SN	Major Activities	LG	Shivastakshi ward no.7(SC-1,TC-6)												Kamal ward no.1(SC-15,TC-10/11)												Gauradaha ward no.9(SC-17,TC-2)												Gaurigunj ward no.1(SC-10,TC-10/11)											
		Months	October				November				December				October				November				December				October				November				December				October				November				December			
		Weeks	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1	Group formation/ reformation/Group discussion and farmer selection																																															
2	Groups orientation																																															
3	Program discusion with elected bodies of LG																																															
4	Interaction with among farmers, traders and other stakeholders (CAP Orientation training)																																															
5	Market visit and survey																																															
6	Action plan preparation/site selection/ crop selection/ seed selection/crop calender preparation/ CAP training to farmers																																															
7	Soil testing/ Use of lime																																															
8	On site coaching and crop plantation																																															
9	Agriculture equipments, machine/agri inputs support to farmers groups																																															
10	Crop plantation																																															
11	Support in organic farming																																															
12	Regular monitoring of field activities																																															

Source: JICA Project Team

Figure 3.3-1 Draft Action Plan of Major Activities in Each Municipality

Activity 40-2	**TOT in CAP Approach for Extension Technicians and Leader Farmers: Group Selling Paddy to a Rice Miller**		
Purpose	To increase rice income through group selling directly to a rice miller		
Expected Output	Increase of participating farmers for the group selling		
Target Area / Person	Rice farmers in KIS area	**Work Period**	Stage-2: Mar 2023 to Sep 2024

Activity Results

Step	Activity	Main Implementor	Implemented Period
1	Planning with NKC for spring rice in 2023	**FG**: to discuss with NKC on group selling conditions **JPT**: to follow up on the discussion	Mar - Apr 2023
2	Planning with NKC for rainy rice in 2023 Evaluation of the group selling of spring rice in 2023 (Ref: Annex B Volume 7-1)	**FG**: to discuss with NKC on group selling **JPT**: to evaluate the results of the spring rice **WUA**: to provide the results and group selling plan to rice farmers	May - Nov 2023
3	Planning with NKC for spring rice in 2024 (Ref: Annex B Volume 7-2) Evaluation of the group selling of rainy rice in 2023	**FG**: to discuss with NKC on group selling conditions **WUA**: to evaluate the results of the rainy rice and provide the results and group selling plan to rice farmers	Dec 2023 - Apr 2024
4	Planning with NKC for rainy rice in 2024 Evaluation of the group selling of spring rice in 2024	**FG**: to discuss with NKC on group selling conditions **WUA**: to evaluate the results of the spring rice and provide the results and group selling plan to rice farmers	May – Nov 2024

Others / Remarks	N / A

Photos

Planning Meeting with NKC - 1

Planning Meeting with NKC - 2

Milling Operation of NKC - 1

Milling Operation of NKC - 2

Combine Harvesting of Spring Rice by NKC

Group Selling of Spring Paddy to NKC

Group Selling of Spring Paddy to NKC

NKC-WUA Meeting on Monsoon Rice Marketing

Holding of Rice Cultivation Workshop for Spring Rice - 1

Holding of Rice Cultivation Workshop for Spring Rice - 2

Explanatory Meeting for the Joint Paddy Marketing - 1

Explanatory Meeting for the Joint Paddy Marketing - 2

Sample of Output

Table 3.3-1 List of Spring Rice Marketing to NKC in 2023

SCC	Local Government	Participated Farmers in Direct Selling to NKC (Household (HH))	Sold Amount of Spring Rice to NKC (ton)
SCC-20, 21	Gauradaha	70	132.4
SCC-14	Kamal	11	25.4
SCC-10 (TB-8)	Shivasatakshi	24	68.6
SCC-8	Shivasatakshi	7	13.7
SCC-5	Shivasatakshi	5	15.6
Total		117	255.7

Source: Field visit in TCP-PIAT

Activity 26 & 41	**Farmer Training and Activity in CAP Approach**		
Purpose	To make the target farmers apply the CAP approach and practice in their fields		
Expected Output	Farmers' agriculture income will be increased		
Target Area / Person	8 model sites (1st and 2nd year sites) Replication sites	**Work Period**	Stage-1: Nov 2021 to Sep 2023 Stage-2: Nov 2022 to Sep 2024

Activity Results

1. Stage-1

Step	Activity	Main Implementor	Implemented Period
1	Provide training to farmers for the winter cropping season in 2021/22	**JPT**: to plan and implement the training **Municipality**: to support and follow up the training	Nov 2021 – Feb 2022
2	Provide training to farmers for the spring cropping season in 2022	**JPT**: to plan and implement the training **Municipality**: to support and follow up the training	Mar - Jun 2022
3	Provide training to farmers for the rainy cropping season in 2022	**JPT**: to plan and implement the training **Municipality**: to support and follow up the training	Jul - Oct 2022
4	Provide training to farmers for the winter cropping season in 2022/23	**JPT**: to plan and implement the training **Municipality**: to support and follow up the training	Nov 2022 - Feb 2023

2. Stage-2

Step	Activity	Main Implementor	Implemented Period
1	Provide training to farmers for the spring cropping season in 2023 Evaluation for the winter cropping season in 2022/23	**Municipality**: to plan and implement the training **AKC**: to support and follow up the training	Mar - Jun 2023
2	Provide training to farmers for the rainy cropping season in 2023 Evaluation for the spring cropping season in 2023	**Municipality**: to plan and implement the training **AKC**: to support and follow up the training	Jul - Oct 2023
3	Provide training to farmers for the winter cropping season in 2023/24 Evaluation for the rainy cropping season in 2023	**Municipality**: to plan and implement the training **AKC**: to support and follow up the training	Nov 2023 - Feb 2024
4	Provide training to farmers for the spring cropping season in 2024 Evaluation for the winter cropping season in 2023/24 (Ref: Annex B Volume 7-3)	**Municipality**: to plan and implement the training **AKC**: to support and follow up the training	Mar - Jun 2024
5	Provide training to farmers for the rainy cropping season in 2024 Evaluation for the spring cropping season in 2024 (Ref: Annex B Volume 7-4)	**Municipality**: to plan and implement the training **AKC**: to support and follow up the training	Jul - Oct 2024

Others / Remarks	N / A

Photos

Market Information Sharing and Crop Selection

Making and Management of Organic Fertilizer

Onsite Coaching on Plant Protection

Onsite Coaching on Nursery Preparation

Good Practice of Vegetable Cultivation

CAP Orientation for a New Group

Observation in Hamro Krishi Farm

Observation in Mama-Bhanja Farm

Observation in Charpane Farm

Observation in Mama-Bhanjha Farm

Discussion on Observation Results of Advanced Farms

Visit to AKC Jhapa Office

Sample of Output

Table 3.3-2 Challenges and Countermeasures in the 1st Cycle of the Training

Shivasatakshi	Current Challenges	• Farmers are attempting to sell their vegetables individually to different traders through their relationships. • The planting area is small in comparison with other model sites. • Youths in the community tend to change their occupation from agriculture to off-farm activities since the model site is near the town area. • Cucumber production was hampered due to hailstorms and hard rainfall.
	Countermeasures	• The farmers would share the results of their sales and consider cooperative sales. • The farmers would review their activities and consider increasing the planting area. • Making a training course in commercial cultivation of vegetables • Introduction of greenhouse farming
Gauriganj	Current Challenges	• Limitation of the participation of the extension technicians • Aiming to ship their vegetables to the Birtamod Market through the wholesale traders • The pilot site is far from the main road, taking time for moving. • Rice and maize are the main crops in the spring season, but those markets are unknown to the farmers.
	Countermeasures	• The Project continues to request more participation from the extension technicians to Gauriganj Municipality through further communication with them. • The farmers would review their activities and make a detailed shipping plan. • Grasping the farm-road conditions and applying them to driving plans • The Project would collect information on cereal crops marketing and share them with the farmers.
Kamal	Current Challenges	• The group is lacking in unity, whose leadership is weak, and whose houses are scattered. • Building trust among the members is very difficult since they are individualist and subsidy oriented. • Cucumber production was hampered due to hailstorms and hard rainfall.
	Countermeasures	• The farmers would experience cooperative shipping and recognize the merits of group work. • The Project would select carefully a better FG with better conditions for the next period. • Introduction of greenhouse farming
Gauradaha	Current Challenges	• The farmers' products are bought cheaply by the aggregators. • Building a good relationship between the farmers and the wholesalers in Damak is required. • Collaboration with NKC for the marketing of spring/monsoon paddy
	Countermeasures	• The aim is to sell their products at a higher price by shipping to the Damak market. • The farmers would review their activities and make a detailed shipping plan. • Discussion with NKC about the marketing of spring/monsoon rice

Source: JICA Project Team

Sample of Output

Table 3.3-3 Visit to Neighbouring Advanced Farms

Item	Contents
Date	August 25, 2023
Places	Chalpane Farm in Birtamode, Birtamod Vegetable Farm, AKC Jhapa Office, Mama-Bhanja Farm in Bhadrapur
Participants	1. Farmers; M-15, F-23, total 38 members 2. Gauradaha Municipality Mr. Shiva Neupane, Agriculture officer Ms. Sanita Rai, JTA 3. Resource person Mr. Ankit Bhattarai, Horticulture staff of AKC Jhapa Mr. Rajendra Kaderiya, Agriculture staff in Birtamod 4. JPT: Mr. Bhumi Prasad Kaphle, Agriculture expert
Purpose	Through observation, we aim to raise farmers' awareness of vegetable cultivation and sales.
Activities	<Chalpane Vegetable Farm> The farmers observed nursery of sweet paper, field of cucumber and bottle gourd plantations. Cucumber was planted with plastic mulching whereas bottle gourd was found growing in field directly. Farmers observed cucumber plantation using plastic mulching. 1,000 seedlings of cucumber (Rucheeta) were planted. More than 3,000 thousand seedlings of sweet paper (Indra truator) were growing in plastic trays. Those seedlings were nearly ready for transplantations in the field. <Birtamod Vegetable Farm> Bottle gourd was cultivated in the tunnel house, whose frames were made by bamboo. There were some marigold flowers on the farm also. Long type cow pea cultivation was found with the bamboo staking. Farmers also observed monsoon mustard (broad leaf mustard) cultivations in the big plastic houses. <AKC Jhapa Office> Mr. Ankit Bhattarai elaborated about their objectives and program activities for the FY 2080/81. A few activities were linked with the interest of farmers in SCC-20. The AKC activities like youth employment in agriculture and road corridor (Terai postal road), AKC vegetable cultivation trials, etc. were linked with SCC-20 farmers directly. <Mama-Bhanja Farm> Mama-Bhanja farm planted many vegetables in this monsoon season also. they have transplanted seedlings, mainly cucumber, bitter gourd, and bottle gourd.
Results	• After advanced farms visit of farmers, a project expert can feel very easy for the extension of other agricultural activities in SC-20. • Farmers have prepared their plan on winter vegetable cultivation • Some farmers purchased the seeds from Agrovets and started on vegetable cultivation.

Source: JICA Project Team

Activity 41-2	**Field Trial of Farming Technologies (Rice and Vegetable)**		
Purpose	To make the farmers scale up for the CAP approach		
Expected Output	Farmers' agriculture income will be increased		
Target Area / Person	8 model sites of Stage-1 and 2	**Work Period**	Stage-2: Mar 2023 to Oct 2024

Activity Results

Step	Activity	Main Implementor	Implemented Period
1	Field trial for rice cultivation on land leveling (Ref: Annex B Volume 7-5)	**AKC and National Agriculture Research Centre (NARC)**: to plan and conduct the trial, and the monitoring and evaluation **Municipality**: to support, follow up, and scaleup the trial **WUA**: to provide laser land leveler and tractor **JPT**: to support monitoring	Mar - Oct 2023 Mar - Oct 2024
2	Field trial for rice transplanter (Ref: Annex B Volume 7-6)	**AKC and NARC**: to provide small type of rice transplanters and technical guidance to FG **Municipality**: to support, follow up, and scaleup the trial **WUA**: Support for selection of demonstrators **JPT**: to support monitoring	Monsoon Rice: May - Jul 2023, 2024 Spring Rice: Jan - Mar 2024
3	Field trial for vegetable cultivation (Ref: Annex B Volume 7-7)	**AKC**: to plan and conduct the trial and the monitoring and evaluation **Municipality**: to support, follow up, and scaleup the trial **JPT**: to support monitoring	Mar - Jun 2023 Nov 2023 - Jun 2024

Others / Remarks	N / A

Photos

Direct Sawing of Rice by a Drum Seeder - 1

Direct Sawing of Rice by a Drum Seeder - 2

Field Trial for Rice Cultivation on Laser Land Levelling

Rice Cultivation Workshop on Laser Land Levelling and Transplanter

Put Soil in the Seedling Tray Under the Guidance of AKC

Sowing Rice Seed Under the Guidance of AKC - 2

Spring Rice Nursery, Covered by Plastic Sheets

AKC Transplanter Trial in Spring Rice

Monsoon Rice Seedlings Nursery in Gauradaha

Monsoon Rice Transplanting in Gauriganj

Weeding on a Carrot Field in Gauradaha

Procurement of Vegetable Seeds by an AKC Expert

Sample of Output

Project for the Promotion of Irrigated Agriculture in Terai Plain (TCP-PIAT), Phase 2

Crop business plan

Fiscal year : 2022/23

R/M municipality: Kamal Rural Municipality ward number 01

Secondary canal n 14A

Tertiary canal no 1&2 Name of farmers group: Samyukta Urjashil Farmers Group

Farmers name:

Mobile no.									
Crop planting season		Crop season (2022-23) Fiscal Year Winter season	Selected Crops for selling: 1. Vegetables 2. Others						
Crop cultivation period (Nursery/planting - harvesting)			Crop 1: vegetables				Crop 2:		
			Target market 1		Target market 2		Target market		
			Market name		Market name		Market name		
			Local	Kamal	Local	Baigundhura	Local	Baigundhura	
Selected crop no	Crop	Crop cultivation period (months) (Nursery - Harvesting)	Crop area unit	Crop area Area	Estimated prodn (Kg,maund)	Sales months	av. Sales price	G.income(Rs.)	
1	Potato	Nov-Feb	Kattha	2	10 maund	April	Rs 1,000/maund	10,000	
2	Mustard	Nov-Jan	Kattha	40	35 mantd	April	Rs 7,000/maund	245,000	
Crop planting season		Crop season (2022-23) Fiscal Year Spring season	Selected Crops for selling: 1. Vegetables 2. Others						
Crop cultivation period (Nursery/planting - harvesting)			Crop 1: vegetables				Crop 2:		
			Target market 1		Target market 2		Target market		
			Market name		Market name		Market name		
			Local	Kamal	Local	Baigundhura	Local	Middleman	
Selected crop no	Crop	Crop cultivation period(months) (Nursery - Harvesting)	Crop area unit	Crop area Area	Estimated prodn (Kg,maund)	Sales months	av. Sales price	G.income(Rs.)	
1	Cucumber	Feb-May	Kattha	5	1000 kg	April-May	RS 25/kg	Rs 25,000	
1	Bottle gourd	Feb-May	Kattha	6	1800 kg	April-May	Rs 20/kg	Rs 36,000	
1	Bitter guoard	Feb-May	Kattha	2	400 kg	April-May	Rs.30/kg	Rs 12,000	
2	Paddy	Mar-Jun	Kattha	10	40 muand	June	Rs 700/maund	Rs 28,000	
Crop planting season		Crop season (2022-23) Fiscal Year Monsoon	Selected Crops for selling: 1. Vegetables 2. Others						
Crop cultivation period (Nursery/planting - harvesting)			Crop 1: vegetables				Crop 2:		
			Target market 1		Target market 2		Target market		
			Market name		Market name		Market name		
							Local	Middleman	
Selected crop no	Crop	Crop cultivation period(months) (Nursery - Arvesting)	Crop area unit	Crop area Area	Estimated prodn (maund)	Sales months	av. Sales price	G.income(Rs.)	
2	Paddy, Ranjit	Jun-Nov	Kattha	45	160	Feb	Rs 1,100/maund	Rs 176,000	

Remarks: 1 ha= 30 kattha, 1 maund=40 kg

Signature: Date: 2023/2/8

Source: JICA Project Team

Figure 3.3-2 A Sample of Crop Business Plan

Activity 41-3	**Establishment of CHSC for Agriculture and Irrigation Machinery**		
Purpose	To encourage Kankai farmers to scale up for the CAP approach, utilizing agriculture and irrigation machinery		
Expected Output	Operation guideline of CHSC		
Target Area / Person	WUA	**Work Period**	Stage-2: Mar 2023 to Jun 2024

Activity Results

Step	Activity	Main Implementor	Implemented Period
1	Installing the operation guideline of CHSC for agriculture and irrigation machinery	**KIMO:** to review the draft guideline, and provide technical recommendations **WUA**: to review and approve the draft guideline **JPT**: drafting the operation guideline	Mar - May 2023
2	Operation training for the machinery	**WUA**: to conduct the operation training **KIMO, Municipalities, AKC**: to support the operation training **JPT**: to plan the operation training	May - Jun 2023
3	Operating, monitoring, and evaluation	**WUA**: to continue the operation **KIMO, Municipalities, AKC**: to support the operation **JPT**: to monitor the operation and evaluate it	Jul 2023 - Jun 2024

Others / Remarks	N / A

Photos

A Shed for the CHSC, Built in the WUA Premises

A Mobile Dryer, Equipped in the CHSC

A CHSC of Kumroj Small Farmer Agriculture Cooperative (SFAC) in Chainpur, Chitwan

Machines of Dumarwana SFAC in Simara, Bara,

Agriculture Machinery Testing and Research Centre - 1

Agriculture Machinery Testing and Research Centre - 2

Sample of Output

Table 3.3-4 Major Roles and Responsibilities of the Four Agencies in the CHSC System

Nos.	Organizations	Key Roles
1	WUA, MCC	1. Establish, operate and manage CHSC under the WUA MCC by forming a CHSC operation and management committee. 2. Allocate appropriate land to establish CHSC within its complex 3. Establish and ensure transparent financial management system 4. Keep the acquired machinery in good and usable condition 5. Confirm and implement instructions and guidance provided by the parties concerned / partners concerned. 6. Not compromise to the quality of the services provided through the CHSC 7. Regularly monitor the performance of the CHSC, and keep the partners updated on the status and performance of the CHSC 8. Resolve any issues and complaints on the performance of the CHSC itself, and report to the partners when necessary 9. Establish and operate a small workshop to undertake minor repair and maintenance work 10. Serve the users / service recipients on first come first service remaining within the policy of the WUA
2	KIMO	1. Construct an appropriate shed for the machinery in the area allocated by the WUA for the CHSC 2. Inspect, supervise and monitor the performance of the CHSC operated and managed by the WUA 3. Ensure that the CHSC operates with a high standard and transparency 4. Retain the ownership of the agricultural machine under it to ensure that the machinery will not be misused and maintained properly 5. Provide necessary guidance and instructions
3	MOLMAC	1. Disburse the fund to buy/procure agricultural machinery within the approved budget limit as per Annual Programme and Budget for the Ministry FY 2078-79 2. Provide technical assistance to the WUA to establish and operate CHSC 3. Inspect, supervise and monitor the performance of the CHSC 4. Any other activities deemed necessary with respect to the CHSC
4	TCP-PIAT	1. Provide a tractor and a laser land leveler to the WUA-CHSC through KIMO but JICA rules and policy to hand over agricultural machinery to KIMO will prevail. 2. Provide technical assistance to WUA to establish, operate and manage the CHSC with the highest standard 3. Keep the MOLMAC and KIMO updated on the status and performance of the CHSC 4. Any other activities deemed necessary with respect to the CHSC

Source: JICA Project Team

Activity 27 & 42	**Study Tour to Successful Place of Market-Oriented Agriculture**		
Purpose	To encourage model farmers to scale up market-oriented agriculture		
Expected Output	Field Visit / Study Tour Report		
Target Area / Person	WUA, LGs, AKC, Model farmers	**Work Period**	Stage-1: Nov 2021 to Sep 2023 Stage-2: Nov 2022 to Sep 2024

Activity Results

1. Stage-1

Step	Activity	Main Implementor	Implemented Period
1	Preparation for the study tour - Making the plan for the study tour and the budget arrangement - Getting approvals from the destinations and related organizations Decision of the attendants and the arrangement of the travel	**JPT**: to make the plan, including a budget, get approvals, and confirm attendants **KIMO and WUA:** to support the planning	Oct - Nov 2023
2	Conducting the field visit tour - Visiting commercial production sites and discussing with related people, WUA, FGs, etc. in Sindhuli Road Corridor Commercial Agriculture Promotion Project (SRC-CAP) sites Reviewing the program of the day	**Model farmers, WUA, Municipalities**: to conduct the study tour **KIMO**: to support the conducting of the study tour	Dec 2023
3	Report making - Compiling collected material and pictures - Making the field visit tour report (Ref: Annex B Volume 7-8) Providing the results for related organizations	**JPT**: to compile collected material, make the report, and provide the results **AKC and Municipality**: to support the report making	Jan 2024

2. Stage-2

Step	Activity	Main Implementor	Implemented Period
1	Preparation for the study tour - Making the plan for the study tour and the budget arrangement - Getting approvals from the destinations and related organizations - Decision of the attendants and the arrangement of the travel	**JPT**: to make the plan, including a budget, get approvals, and confirm attendants **KIMO and WUA:** to support the planning	Oct - Nov 2023
2	Conducting the study tour - Visiting commercial production sites and discussing with related people, WUA, FGs, etc. - Reviewing the program of the day	**Model farmers, WUA, Municipalities**: to conduct the study tour **KIMO**: to support the conducting of the study tour	Dec 2023
3	Report making - Compiling collected material and pictures - Making the study tour report Providing the results for related organizations	**JPT**: to compile collected material, make the report, and provide the results **AKC and Municipality**: to support the report making	Jan 2024

Others / Remarks	N / A

Photos

Sharada Batase FG, Dhulikhel Municipality, Kavre

Vyakure Devi FG, Melung Rural Municipality

Darsan Dunga FG, Dhulikhel Municipality, Kavre

Mangaleswor FG, Roshi Rural Municipality, Kavre

Large-scale Farming in Jagannathpur, Parsa - 1

Large-scale Farming in Jagannathpur, Parsa – 2

Dumarwana SFAC in Simara, Bara

Agriculture Tools Engineering and Research Centre, Birganj - 1

Agriculture Tools Engineering and Research Centre, Birganj - 2

Madhi Organic Agriculture Farm & Research Centre, Chitwan - 1

Madhi Organic Agriculture Farm & Research Centre, Chitwan - 2

Study Tour Review Meeting at WUA Meeting Hall

Sample of Output

Table 3.3-5 A Sample of Study Tour Note

Date	12th -16th December,2023
Purpose	To strengthen the CAP activities through motivation of WUA members in crop production, marketing, and agriculture mechanizations
Attendants (13th Dec. 2023)	No. of tour participants 1) Leader farmers (M-12, F- 2) = 14 2) WUA MCC members (M-10, F- 7) = 17 3) Local Governments (M-3, F-1) = 4 4) AKC (M-1, F-0) = 1 5) TCP-PIAT (M-3, F-1) = 4
Place	SFDC, Dumarwana, Maulapur Jeetpur, Simara, Bara

Activities

- JPT informed purpose of the visit to all attendants including Small Farmer Development Cooperative (SFDC). The cooperative manager informed the participants about the activities of cooperatives.
- GON has supported the plan that the cooperative would establish the first CHSC in Nepal.
- Total number of cooperative members are 8,500.
- Cooperative was established 34 years ago in 1998
- Cooperatives has five sub- service centres, among them the only one centre has established. The one sub centre supports farmers including facility retal, rice mill, cooking oil mill, wheat seed production activities, grain storage and other services.
- Monthly saving and credit provision are mandatory for all members of the cooperative.
- To establish the CHSC, the land was purchased by the cooperative. MOALD has supported the cooperative for the construction of infrastructures / buildings in 80-85% subsidy policy of government. It has supported running CHSC effectively.
- The cooperative also purchased the machines (tactors, threshers and maize drillers) in partnership of 50-50% cost bearing modality of government.
  As per Mr. Kattel, due to the activities of SFDC, the local market prices of machines were controlled. If private machine supplier increases the price of machines, farmers could not use their machine, farmers can request the cooperative to get the machines, because the cooperative machine is cheaper than private machine supplier. Therefore, the private machine supplier could not raise their machine price also.
- The cooperative supports farmers for land plowing by using tractors. The rate of land plowing was slightly less than the market price (Example, SFDC supports farmers for land plowing in Nrs 1,700/hour, but market price is 2,000-2,200/hour for using rotavator in land plowing). Farmers need to put their request of machine to the cooperative and cooperative provides the opportunities to the farmers based on the first application (request) first service. The billing of machine used is managed/ provided to farmers / member of cooperative in the respective field/site. The cash payments are different, which means the spot payment on the site and later payment in the offices. The price of later payment is higher than the previous one on the site.
- The SFDC supported farmers to use machines, as a result the production cost, mainly rice and wheat, was reduced drastically.
- Mr. Pradip sing Baral, chairman of the cooperative said that due to support of the government, cooperative reached in this position. He also focused on the fact that unity among the cooperative members is very important to run the CHSC effectively. A machine should be purchased based on their requirements/ demands and calculating profit also. If a machine could not provide profit to the farmers/cooperatives that machine should not be purchased. The cooperative purchases paddy, store it and milling. They sell fresh rice, rice husks, and rice brans by themselves.
- As per Mr. Pradip, production is no problem but how to make market / selling easy. They have a problem in marketing instead of production.
- The cooperative searches the market prices before determining/fixing the price of their CHSC, this is the technique of price fixation/determination of cooperative. After a market survey of different places, the price of wheat seed is fixed by adding 5% to last year price.
- The price of machine is fixed than the 10-15 % less of market survey prices. In the monsoon season, the use of machines depends on the availability of water. The SFDC can do the small maintenance, but for bigger one, they will invite the skill manpower from outsiders.

Results	WUA members became aware of different types of institutional based agricultural activities. WUA can plan agriculture production and marketing related activities based on the interest of SCCs.

3.4 Output 4: Establishment of the Activity Execution Cooperation System for Improvement of Irrigated Agriculture

Activity 28 / 43	**Periodical Monitoring for the Promotion of Irrigated Agriculture**		
Purpose	To implement and monitor of activities of promotion of irrigated agriculture by PMC and Task Team		
Expected Output	Promotion of irrigated agriculture in KIS area		
Target Area / Person	PMC member Task Team Member	**Work Schedule**	June 2021 to December 2024
Contents of Activity			

1. **PMC meeting: chaired by DDG of DWRI (PD)**

Date	Venue	Participants	Agenda and Results
25th August 2021	Online meeting	1) DDG of DWRI 2) Task Team Member 3) JICA Nepal Office	1) Report on achievement of the Project activities up to August 2021 and further schedule based on Monitoring Sheet Ver. 3
28th June 2022	Online meeting	1) DDG of DWRI 2) Division Chief of MOWSIE, Koshi Province 3) Senior Agriculture Dev. Office of MOLMAC, Koshi Province 4) AKC Chief, Jhapa 5) Task Team Member 6) JICA Nepal Office	1) Update the Project progress up to June 2022 and further schedule 2) Tentative target value of PDM Indicators 3) C/P programme and budget for next fiscal year (2079/80) 4) Schedule for 3rd JCC meeting
22nd December 2022	KIMO Meeting Room with online meeting	1) DDG of DWRI 2) Division Chief of MOWSIE, Koshi Province 3) Secretary and Senior Agriculture Dev. Office of Ministry of Agriculture, Koshi Province (MOA), Koshi Province 4) AKC Chief, Jhapa 5) Task Team Member 6) JICA Nepal Office	1) Joint site visit before the meeting 2) Updating Project progress and achievement 3) Share of learning from overseas training in Japan by KIMO Engineer 4) Proposed model of irrigated agriculture in Terai area (Kankai model) 5) Revised work schedule and draft W/P of Stage-2
9th February 2023	Meeting Hall of DWRI with Online Meeting	1) DDG of DWRI 2) Acting Director General (DG) of DOA 3) Secretary of MOA, Koshi Province 4) AKC Chief, Jhapa 5) Task Team Member 6) JICA Nepal Office	1) Updating Project progress and achievement 2) Issues, findings and lessons learned through Stage-1 activities 3) Work schedule of Stage-2
5th December 2023	KIMO Meeting Room	1) DDG of DWRI 2) Head of Division, MOWISE 3) Division Chief of MOIAC 4) AKC Chief, Jhapa 5) Task Team Member 6) JICA Nepal Office	1) Review of Project progress and issues 2) Action plan of implementation of 3rd year of replication sites 3) Review and finalization of PDM target
7th June 2024	Meeting Hall of DWRI	1) DDG of DWRI and SDE 2) DDG of DOA 3) Secretary and Head of Division, MOWISE 4) AKC, Jhapa 5) Task Team Member 6) JICA Nepal Office	1) Presentation of Terai Irrigated Agriculture Promotion Model (PIAT-model) and outline of draft guidelines 2) Replication of PIAT model in other Terai irrigation schemes 3) Strategy for continuation and sustainability of TCP-PIAT activities in Kankai

2. Task Team meeting: chaired by KIMO Chief (PM)

1) The Project formed Project Task Team consisting of field-level stakeholders: KIMO, WUA and Local Governments to implement field activities as per the W/P.
2) Project Task Team meeting was held every 1 to 3 months regularly through the Project period with chairmanship of Chief of KIMO to share the activities progress, issues and discuss on further plan such as selection of model sites, cropping plan, water distribution plan and demonstration activities in the next cropping season.
3) Budget plan for next fiscal year in each agency was also discussed and confirmed for cooperative activities in the selected model sites.
4) Chief / representative of AKC, Jhapa was invited to the Project Task Team meeting. Linkage with the private sector for rice mill approach and introduction of modern technology such as demonstration of land levelling, rice transplanting, harvesting were discussed and planed in the meeting.
5) Mayor / Chairperson of LGs were also invited to the meeting as Chief Guest and meetings were held at the office of LG at several time.
6) Date and number of Project Task Team meeting held at every year through the Project period is summarized as below:

Year	Date of Meeting held	Numbers
2021	14th July, 3rd August, 18th August, 15th September, 3rd October, 1st December	6 times
2022	10th January, 10th February, 14th March, 18 April, 25th May, 25th August, 27th September	8 times
2023	18th January, 1st June, 11th September	3 times
2024	26th February, 5th June, 30th July, 6th December	4 times
Total		21 times

Others / Remarks	N / A

Activity 44	Preparation of draft of Guidelines and Manuals for the Promotion of Irrigated Agriculture		
Purpose	To prepare drafts of guidelines and manuals by Task Team		
Expected Output	1. Draft guideline for Promotion of Irrigated Agriculture in Terai (Nepali / English) 2. Draft manual for Water Distribution, Facility Maintenance, Market-oriented Agriculture and WUA Institutional Development		
Target Area / Person	-	**Work Schedule**	March 2023 to January 2025

Activity Results

1. Draft Guidelines

Step	Activity	Person in Charge	Implementation Period
1	Preparation of 1st draft Contents of draft guidelines for Promotion of Irrigated Agriculture and Composition of draft manuals and confirmed in 4th JCC meeting held on 21st April 2023	JPT	Mar. to Apr. 2023
2	Preparation of draft guidelines in English	JPT	May 2023 to June 2024
3	Discussion on draft guideline in PMC meeting held on 5th June 2024	JPT, PMC Member	June 2024
4	Update the guideline based on the comments from PMC meeting	JPT, Task Team	June to Sep. 2024
5	Submission of draft guidelines to PMC member and presented in the workshop held on 21st September 2024	PD and PMC member Task Team	Sep. 2024
6	Preparation of summary version of draft guidelines and translate into Nepali	JPT	Oct. 2024
7	Discussion on draft guideline with Task Team member and update based on comment	Task Team JPT	Nov. 2024
8	Discussion on draft guideline with PMC member and update based on comment	PMC member, JPT	Dec. 2024
9	Submission of updated guidelines to JCC member		Jan. 2025
10	Approval of draft guidelines by JCC meeting	JCC	Jan. 2025

2. Manual

Step	Activity	Person in Charge	Implementation Period
1	Preparation of draft manuals in English	JPT	May 2023 to Sep. 2024
2	Discussion on draft manual with PM	KIMO, JPT	Sep. 2024
3	Translate of draft manual into Nepali	JPT	Sep. to Dec. 2024
4	Submission of draft manuals to PMC member and update manual based on comments.	PD and PMC member Task Team	Dec. 2024
5	Submission of updated manuals to JCC member		Jan. 2025
6	Approval of manuals by JCC meeting	JCC	Jan. 2025

Others / Remarks	Draft guidelines are presented in *Annex A Volume 1*. Draft manuals are presented in *Annex A Volume 2*.

Activity 45	**Coordination with Grant Aid Project**		
Purpose	To disseminate the Model of promotion of irrigated agriculture in Terai Plain to other irrigation schemes in Terai area		
Expected Output	To conduct training to the stakeholder of CNIS and CMIS		
Target Area / Person	Stakeholders of CNIS and CMIS	**Schedule**	Sept. 2024

Activity Results

The following training workshop were conducted at KIS:

No.	Item	Description
1.	Date	16th to 18th September 2024
2.	Venue	1st Day: Meeting Room of KIMO 2nd Day: Model Site of KIS, Meeting Hall of WUA 3rd Day: Meeting Hall of WUA
3.	Objectives	1) To share the experience and activities of TCP-PIAT in KIS to the key stakeholders of CNIS and CMIS 2) To introduce PIAT-model formed and piloted in KIS for replication of the model in the respective irrigation scheme
4.	Participants	1. CNIS: 7 Nos. 1) Chandra Nahar Irrigation Management Office: 2 Nos. 2) CNIS WUA: 3 Nos. 3) Municipality: 2 Nos. 2. CMIS: 8 Nos. 1) Chanda Mohana Irrigation Management Office: 2 Nos. 2) CMIS WUA: 1 Nos. 3) Sub-Scheme WUA: 3 Nos. 4) Municipality: 2 Nos.
5.	Workshop Program	

Date	Time	Programme	Resource Person
Day 1 16th Sep.	11:00 – 11:30	Welcome remark & self-introduction	Md. Nasiullah, Senior Association Organizer of KIMO
	11:30 – 12:00	Objective and importance of training	Mr Ram Narayan Kshetri, WUA Expert of JPT
	13:00 – 14:00	Introduction of KIS and Recent Development	Mr Umesh Kumar Sujakhu, Chief, KIMO
	14:00 – 15:00	Introduction of WUA and Recent Development	Mr. Kamal Prasad Bhandari, President of WUA
	15:00 – 15:30	Objective, expected result and achievement of TCP-PIAT	Mr. Akira Kawai, Chief Advisor and Dr Birendra Bir Basnyat, Agriculture Expert
Day 2 17th Sep.	9:00 – 12:00	**<Field Visit>** 1. TB-8 of MC-R-IV: Demonstration site (Land leveling, Use of mechanical rice transplantation) 2. TC-11&12 of SC-4: Model site to observe PIAT CAP promotion model site, FC construction, on-farm development works	Mr. Pankaj Ghimire and Mr Devi Tiwari, water users in TB-8 Mr Dewananda Sah, model farmers in TC-11&12 of SC-4 Mr Rabin Bhattarai, Agriculture Officer Shivasatakshi
	13:00 – 15:00	**<Technical Training Session 1>** Experience sharing on market-oriented agriculture at model sites (CAP approach) by Four LGs	Mr Rabin Bhattarai Agriculture Officer, Shivasatakshi Mr. Mahendra Bohora Agriculture Officer, Kamal Ms Bhima Rai, Agriculture Officer, Gauriganj

					Ms Sanita Rai, Agriculture Officer, Gauradaha
			15:00 – 16:00	Experience Sharing on the Introduction of modern agricultural technologies by AKC in KIS Area	Mr Sagar Bista, Chief of AKC, Jhapa
		Day 3 18th Sep.	9:00 – 10:00	Impression from the participants to the TCP-PIAT activities in KIS	Facilitated by Dr. Birendra Bir Basnyat, Agriculture Expert
			10:00 – 10:15	**<Technical Training Session 2>** Highlights of the PIAT-Model: Key Elements, Implementation Mechanisms, Results (Outcomes and Outputs)	Dr. Birendra Bir Basnyat, Agriculture Expert
			10:15 – 12:00	Group works for preparation of action plan of replication of PIAT model Group 1: CNIS team Group 2: CMIS team.	Facilitated by Mr. Kamal Prasad Bhandari, President of WUA and JPT
			12:00 – 12:30	Presentation of group works results by participants	Mr Baburam Basnet, WUA Secretary
			12:30 – 13:30	Wrap-up Session	Chief Guest: Mr. Megahang Thopra, Mayor, Shivasatakshi
6.	Observation	1. The 3-day training program on the Irrigated Agriculture Promotion Model (PIAT Model) for stakeholders of the CNIS and CMIS was successfully conducted, blending field-based learning with classroom lectures. The program aimed to share the experiences and activities of the TCP-PIAT in the KIS and introduce the Kankai Model to key stakeholders from the two irrigation schemes. 2. Through interactive sessions, field visits, and experience-sharing exercises, the participants gained valuable insights into modern agricultural technologies, market-oriented agriculture, and the implementation of the Kankai Model. The involvement of various LG units, WUAs, and agriculture experts fostered productive discussions on practical applications of the model in their respective areas. 3. The training not only enhanced the participants' knowledge of advanced farming techniques but also promoted collaboration between stakeholders, which is essential for the long-term sustainability of the irrigation systems. The feedback and support from LGs further strengthened the potential replication of the PIAT Model in other regions. 4. Overall, the training achieved its objectives, creating a strong foundation for future agricultural development in the region.			

Others / Remarks	N / A

Photos

Presentation of KIS and Recent Activity (Day1)

Joint site visit to Sardare Intake showing how to control water distribution (Day 1)

Experience sharing by farmers of spring rice promotion by using rice transplanter, market linkage with Arju rice mill and FC construction (Day 2)

Experience sharing by model farmers of vegetable production through CAP approach (Day 2)

Experience sharing on introduction of modern agriculture technology by AKC Chief (Day 2)

Group works for preparation of action plan: Chandra Nahar (Day 3)

Presentation of action plan: Chandra Nahar (Day 3)

Closing remarks by Chief Guest, Mayor of Shivasatakshi (Day 3)

Activity 46	**Organizing Workshop for Promotion of Irrigated Agriculture**		
Purpose	To present and introduce the model of irrigated agriculture in KIS area to stakeholders in other irrigation area in Terai Plain.		
Expected Output	To start dissemination of Kankai model in other irrigation area.		
Target Area / Person	Federal and Province Government Staff, Stakeholders in other irrigation area in Terai Plain	**Schedule**	Sept. 2024

Contents of Activity

The following dissemination workshop was conducted at Meeting Hall of Shivasatakshi Municipality, Jhapa.

Nos.	Item	Description
1	Date & Time	22nd September 2024, 10:00 to 16:30
2	Venue	Meeting Hall of Shivasatakshi Municipality
3	Objectives	1) To share the "Promotion of Irrigated Agriculture Model (PIAT Model)" formed based on the experience in KIS through joint efforts of key stakeholders 2) To obtain input and suggestion from the participants on the draft guidelines prepared by the Project Task Team
4	Participants	1. Chairperson: PD of TCP-PIAT (DDG of DWRI) 2. MOEWEI & DWRI: 2 Nos. 3. MOWSIE, Koshi Province: 1 Nos. 4. MOIAC, Koshi Province: 1 Nos. 5. AKC in Koshi Province: 4 Nos. (Jhapa, Morang, Sunsari, Udaypur) 6. AKC in Madesh Province: 1 Nos. 7. Municipality in Jhapa District: 11 Nos. 8. Sunsari Morang Irrigation Project Office & WUA in Koshi Province: 2 Nos. 9. Kamala Irrigation Management Office & WUA in Madesh Province: 4 Nos. Total 31 Nos.
5	Workshop Program	

Time	Programme	Resource Person
10:00 - 10:30	Welcome remarks & self-introduction	Master of Ceremony Mr. Umesh Kumar Sujakhu Chief, KIMO
10:30 – 10:50	Objectives of workshop and expected results	Dr Birendra Bir Basnyat, Agriculture Expert, JPT
11:00 – 13:00	Field visit to the demonstration site of TB-8	Mr Rabin Bhattarai, Agriculture Officer Shivasatakshi Mr. Pankaj Ghimire and Mr Devi Tiwari, water users in TB-8
14:00 – 14:20	Sharing of experience of demonstration of modern agriculture technology by AKC in KIS area	Mr Sagar Bista, Chief of AKC, Jhapa
14:20 – 14:50	Presentation of JICA TCP-PIAT activities and achievemnet	Mr Umesh Kumar Sujakhu Chief, KIMO
14:50 – 15:20	Presentation of draft guidelines including PIAT-model	Mr. Akira Kawai, Chief Advisor and Dr Birendra Bir Basnyat, Agriculture Expert, JPT
15:20 – 16:00	Open discussion on the guidelines	Facilitated by Mr. Devraj Niraula, the DDG of DWRI
16:00 – 16:30	Remarks	Mr. Kamal Prasad Bhandari, President of WUA Mr. Pradip Bantawa, Secretary, MOWSIE, Koshi Province
	Special speech from Chief Guest	Mr. Megahang Thopra, Mayor, Shivasatakshi
	Closing Remarks	Mr. Devraj Niraula, the DDG of DWRI

6	Observation	1. The Dissemination Workshop for the Promotion of Irrigated Agriculture in the Terai Area successfully achieved its objectives. It facilitated the sharing of the PIAT-model, developed through joint efforts in the KIS, and provided an opportunity for valuable feedback from stakeholders. The open discussions highlighted the model's potential for replication across other irrigated regions of Nepal, with particular emphasis on enhancing the role of WUA and fostering collaboration between government bodies, local communities, and agricultural markets. 2. The field visit offered participants a practical demonstration of modern farming techniques, and the interaction with local farmers reinforced the positive impacts of the TCP-PIAT Project. The workshop was the consensus on the need to translate and distribute the PIAT guidelines in Nepali, ensuring broader understanding and input from all stakeholders. 3. Key speakers, including representatives from provincial governments, WUA, and municipal bodies, expressed strong support for the Project's continuation and expansion. The collaboration between these entities has already led to tangible benefits for farmers, particularly through the promotion of market-oriented agriculture and improved irrigation practices. With ongoing coordination and support, the PIAT Model holds the potential to further enhance agricultural productivity and sustainability in the Terai region. 4. Overall, the workshop reinforced the importance of continued cooperation and resource allocation to ensure the long-term success and replication of the PIAT Model in other regions, with the ultimate goal of improving the livelihoods of farmers and strengthening Nepal's agricultural sector.

Others / Remarks	N / A

Photos

Opening Session facilitated by Chief of KIMO at Meeting Hall of Shivasatakshi

Interaction with replication site farmer demonstrating rice transplanter for spring / monsoon rice in TB-8

Joint field visit to demonstration farm of rice transplanter for monsoon rice in TB-8

Comment and feedback from DDG of DWRI and other participants

CHAPTER 4 RESULTS OF JOINT TERMINATION EVALUATION

4.1 Results of Terminal Evaluation

The Terminal Evaluation for the Project was carried out from 20th September to 2nd October 2024 in Nepal. The Project site visit and interviews and meetings with the counterparts, member of Water Users Association (WUA) and model farmers were conducted by the Japan International Cooperation Agency (JICA) Terminal Evaluation Team. The member of the Team is shown in the following table:

Table 4.1-1 Members of JICA Terminal Evaluation Team

No.	Assignment	Name	Position and Organization
1	Team Leader	Dr. SATO Katsumasa	Senior Advisor, JICA
2	Evaluation Planning	Ms. SHIROISHI Keiko	Team 3, Agricultural and Rural Development Group 1, Economic Development Department, JICA
3	Evaluation & Analysis	Mr. DOJUN Isao	Consultant, Chief Engineer, Chuo Kaihatsu Corporation

Source: Terminal Evaluation Report (Oct. 2024), JICA Terminal Evaluation Team

Terminal evaluation was made based on the six Development Assistance Committee's (DAC's) evaluation criteria's, namely 1) Relevance, 2) Coherence, 3) Effectiveness, 4) Impacts, 5) Efficiency and 6) Sustainability. Each evaluation criteria is graded on a scale of 1 to 5, such as 1) High, 2) Moderately High, 3) Moderate, 4) Moderately Low, and 5) Low.

According to the Terminal Evaluation report, the evaluation results are summarized as below:

Table 4.1-2 Evaluation Results based on Six Criteria

Evaluation Criteria	Results
1. Relevance	
Rating	**High**
Assessment	**(1) Relevance with the development policies: Conformity of the Project Purpose and the Overall Goal to the development policies and the plans of the Government of Nepal (GON)** ➢ One of the National Strategies of the Fifteenth Plan 2019/20 - 2023/24 is to increase production and productivity. For increasing production and productivity, expansion of irrigation facilities, effective implementation of land use, mechanization, commercialization, and industrialization of agriculture are regarded important. Sustainable and reliable irrigation facilities is also considered important for enhancing agricultural production and productivity. In addition, strengthening the operation and maintenance of existing irrigation systems is also regarded important. ➢ According to the Agriculture Development Strategy (ADS) 2015 to 2035, the transformation of Nepalese agricultural sector into agribusiness is necessary. The expected outcomes of the ADS include higher productivity and profitable commercialization. ➢ One of focus of the Irrigation Master Plan (IMP) 2019 is the increase year-round irrigation across the country with a particular focus in the Terai. The IMP 2019 will also focus on water management and construction, including the improvement of on-farm water management practices.

	➢ Project Purpose is to formulate a model of irrigated agriculture which guides better irrigation water management of existing irrigation facilities, promotion of commercialized or market-oriented agriculture, promotion of use of cost-effective agricultural machinery, etc. ➢ Thus, the objectives of the Project are well relevant to the national plan and strategies. **(2) Relevance with the development needs (needs of the country, target areas, and target society) and the selection target areas** ➢ Rice production in Nepal imports rice and there is need to increase rice production. Majority of rice production is practiced in Terai, especially in the irrigation schemes. ➢ The revised Irrigation Policy 2080 (2023) mentioned the following issues: 1) reduction in annual irrigated area due to inadequate irrigation facility operation and maintenance, 2) slow crop diversification, commercialization, and mechanization, 3) insufficient capacity building of water users' associations, and 4) insufficient responsibility sharing and coordination among federal, provincial, and local governments regarding development and management of irrigation facilities. ➢ The Irrigation Policy also mentioned that in order to improve agricultural productivity and contribute to the local economy, the coordination among federal, provincial, and local governments must be strengthened, and water resources must be maximized through improved irrigation water management and irrigation facility management. ➢ The Project has components addressing above-mentioned issues. **(3) Appropriateness of the project approach** ➢ The government agencies have provided support to the irrigation and the agricultural sectors independently. ➢ As a result, the effects of irrigation did not always contribute to the increase of agricultural production and income. ➢ As a means to solve this problem, a Task Team consisting of local stakeholders related to irrigation and agriculture (WUA, Irrigation Management Office (IMO), Local Government (LG), and Agriculture Knowledge Centre (AKC)) was formed. ➢ Through the project activities to date, a collaborative network was established with WUA as the leading player, the IMO, AKC and LG, and the private sector and cooperatives. ➢ Effective activities became able to conduct in collaboration with various stakeholders. Therefore, the project approach was very appropriate. **(4) Comparative advantage of technical cooperation by Japan** ➢ JICA has extensive experience in technical cooperation for irrigation and market-oriented agriculture, not only in Nepal but across Asia and Africa. ➢ For example, Commercial Agriculture Promotion (CAP) approach developed under the Sindhuli Road Corridor Commercial Agriculture Promotion Project (SRC-CAP) (2015-2020) (JICA supported technical cooperation) is utilizing in the Project. ➢ Therefore, JICA has a comparative advantage in implementing technical cooperation for promoting irrigated agriculture.
2. Coherence	
Rating	**High**
Assessment	**(1) Conformity with Japan's assistance policy for Nepal** ➢ One of the priority areas of the country assistance policy of the Government of Japan (GOJ) for Nepal (September 2021) is Economic growth and poverty reduction. ➢ The Agricultural sector is one of main industry in Nepal and support to the improvement of agricultural productivity is regarded important for contributing poverty reduction. ➢ According to the rolling plan of the GOJ for Nepal (April 2023), this Project is

	considered as one of the projects within the agriculture and rural development program. ➢ As the Project aims at the improvement of irrigated agriculture, the objective of the Project is consistent with Japan's assistance policy. **(2) Contribution to achieving the Sustainable Development Goals (SDGs) targets in Nepal** ➢ According to the Nepalese "Sustainable Development Goals: Status and Roadmap: 2016-2030", SDG 1 is "No Poverty", and SDG 2 is "No Hunger". ➢ This Project promotes the improvement of irrigated agriculture for better irrigation management, better agriculture production, and an increase of agricultural income. Therefore, the objectives of the Project are consistent with the SDGs. **(3) Synergistic effect / mutual relations with JICA's other projects** ➢ As mentioned above, the CAP approach developed under the SRC-CAP has been utilized in the Project for promoting market-oriented agriculture. As a results of the use of the CAP approach, the farmer started vegetables in accordance with market needs (selection of crops and timing of cultivation considering market price and required quality, etc.). The linkage between farmers and the private sector has been created, and farmers have become able to sell their products at higher price. ➢ In addition, the Project has disseminated methods for promoting the Model for irrigated agriculture, which is mostly developed under the Project, to other two irrigation schemes. The Japanese government is supporting the improvement of the main irrigation facilities of one of the schemes (Chandra Nahar Irrigation Scheme). Therefore, there are synergistic effects with other JICA-supported projects.
3. Effectiveness	
Rating	**High**
Assessment	➢ As mentioned in Chapter 2 Achievement of the Project, the Model of Irrigated Agriculture developed by the Project and the guidelines for the Model were drafted. The guidelines of the Model will be finalized by January 2025. Finalized guidelines are expected to be approved at the Joint Coordination Committee (JCC) meeting, which will be held in January 2025. ➢ The Project Purpose will be achieved by January 2025; therefore, the effectiveness of the Project will be High.
4. Impact	
Rating	**Moderately High**
	At the evaluation period, it was difficult to prospect whether the Overall Goal would be achieved by 2029. We observed several positive impacts of the Project. The overall impact of the Project is therefore rated as Moderately High. **(1) Prospects of achieving the Overall Goal** **Overall Goal:** **The Model Developed by the Project is practiced in Terai Irrigation Area.** Indicator: Number of Irrigation schemes where the Model has been practiced. ➢ The target figure (numerical indicator) was not set at the evaluation period. Therefore, it was not possible to prospect whether this indicator would be achieved within several years after the termination of the Project. ➢ In the 6th JCC meeting held in January 2025, the target was finally set at "At least one (1) Irrigation scheme". **(2) Impacts observed** The followings are examples of positive impacts or spillover effects of the Project based on the results of interviews with members of the canal committees, farmers, and other Nepalese persons involved in the Project.

	1) Significant increase in spring rice production By linking farmers and a rice miller and the improvement of water availability in the spring season, spring rice cultivation was increased drastically. According to the members of WUA, the spring rice cultivation area was increased from about 1,000 ha in the last year to around 3,000 ha. The planned spring rice cultivation areas based on the water distribution plans were 1,660 ha in 2022/23 and 2,430 ha in 2023/24. In the case of the model area (the command area is 407 ha), the spring rice cultivation area was increased from 112 ha to 116 ha (The calculation on the spring rice cultivation area based on the endline survey will be completed by the end of October.). As for linkage with a rice miller, the farmer group made a contract on the collective rice selling to the rice mill company in the spring season last year (2023). The price of rice sold was very high compared to the prices of previous years. The deal in the spring season of this year (2024), the farmer group can sell rice to the rice mill company without making a contract (verbal promise). 2) Increase in vegetable cultivation and income generation Vegetable cultivation for the selling market was uncommon in the Kankai Irrigation Scheme (KIS). By introducing the CAP approach and input support[1] by the LGs, vegetable cultivation is increasing, and additional income has been generated. 3) Strengthened relationship / collaboration among stakeholders Collaborative relationships among stakeholders have been strengthened through implementing various meetings (Project Monitoring Committee (PMC) meetings and Task Team meetings) and project activities. The stakeholders are officers of federal, provincial, LG, members of WUA, including various committee members (Main Canal Committee (MCC), Secondary Canal Committee (SCC), and Tertiary Canal Committee (TCC), etc.), JICA experts, national experts, and private sectors. It seems that the training in Japan contributed to raising motivation for active involvement in project activities and also improved relationships with officer / staff of other organizations. 4) Ownership of target farmers At the dissemination workshop held in September 2024, target farmers explained their own experiences, knowledge and skills gained from the Project to participants. One of the farmers said, “even though I am not yet confident enough to teach other farmers, but very interested in teach”. It is found that there is a high possibility for sharing their experiences, knowledge, and skills as a way of farmer-to-farmer extension after the completion of the Project.
5. Efficiency	
Rating	**Moderately High**
Assessment	Although project activities were affected by the COVID-19 pandemic and other issues, degrees of the achievement of four (4) outputs are generally high. Therefore, the efficiency of the Project is rated as Moderately High. **(1) Effect of COVID-19 pandemic** ➢ COVID-19 was expanded widely in 2020. There was a one-year interval between Phase-1 (From March 2019 to April 2020) and Phase-2 (From April 2021 to March 2025) of the Project. During this period, there was no dispatch of JICA experts. ➢ In the Phase-2, JICA and national experts could not conduct field-level activities from April 2021 to August 2021, because of the direction of the JICA Nepal office. ➢ Implementation of physical meetings and workshops was also restricted from September 2021 to January 2022, and the capacity enhancement of WUA members and extension officers was delayed.

[1] Plastic tunnel houses (for preventing damage of rain), plastic sheets for mulching, seedling trays and others

	(2) Other issues affected the progress of project activities ➢ Stoppage of irrigation water supply due to rehabilitation of headworks from December 2021 to June 2022 ➢ Difficulty conducting planned trainings, workshops, and field activities during the election of LG in May 2022 and general election in Nov. 2022 ➢ Difficulty of conducting planned trainings, workshops, and field activities with WUA members because of the delay of election of executive WUA members up to April 2023. **(3) Inputs by the Japanese side** ➢ As mentioned, four short-term JICA experts in Phase-1 and 5 short-term JICA experts were dispatched. Considering the results of the questionnaire survey to the Nepalese counterparts, dispatch of JICA experts is appropriate in terms of number of persons, timing of dispatch, specialty, communication ability, etc. ➢ Regarding the training in Japan, 46 persons in total have participated in short-term training. These trainings contributed to not only their capacity building but also the increase of motivation for project activities with very effective collaborative manner. ➢ JICA provided equipment and machinery for the maintenance of irrigation canals, the improvement of working efficiency for rice cultivation, and office equipment, etc. It seems that the provision of equipment is appropriate and utilized well for conducting project activities. **(4) Inputs by the Nepalese side** ➢ 17 Nepalese counterpart personnel including the Project Director and Project Manager is involving at the time of the terminal evaluation in the project activities from Ministry of Energy, Water Resources and Irrigation, Koshi Province (MOEWRI), Department of Water Resources and Irrigation (DWRI), Ministry of Water Supply, Irrigation and Energy, Koshi Province (MOWSIE), Kankai Irrigation Management Office (KIMO), AKC, WUA, and 4 LGs. ➢ According to the results of the questionnaire survey to concerned personnel, assignment and involvement of Nepalese counterpart personnel is appropriate. ➢ However, there is limited number of engineers in KIMO due to study abroad and personnel shift. Frequent changes of Nepalese counterpart personnel affected effective implementation of project activities. ➢ As for operation costs borne by the Nepalese side, significant amounts of budget were allocated by KIMO, AKC, and four (4) municipalities. These financial arrangements by Nepalese side contributed effective implementation of project activities. **(5) Project management** ➢ 5th JCC meetings, 10 PMC meetings, and 20 Task Team meetings were held as of July 2024. These meetings have important functions to review the progress of the project activities, revise the plan of project activities when necessary, monitoring the progress of the project activities, and exchange opinions on major issues that arise during the implementation of the Project. ➢ It seems that project management has been well done.
6. Sustainability	
Rating	**Moderately High**
	The policy and organizational sustainability of the Project will be high, and the technical sustainability of the Project will be moderately high. On the other hand, ensuring financial sustainability for replicating the Model will be probably at moderate or moderate low. Overall, it appears that the sustainability of the Project is likely to be Moderately High, based on the facts described below. **(1) Policy aspect** ➢ This project aims at promoting irrigated agriculture (improvement in both irrigation

	and agriculture). As mentioned in the section on relevance, one of the National Strategies of the Fifteenth Plan 2019/20～2023/24 is to increase production and productivity. For increasing production and productivity, expansion of irrigation facilities, effective implementation of land use, mechanization, commercialization and industrialization of agriculture are regarded important. ➢ One of focus of the ADS is higher productivity and profitable commercialization. One of focus of the IMP 2019 is the increase year-round irrigation across the country with a particular focus in the Terai. ➢ Therefore, the policy sustainability of the Project will be high. **(2) Organizational aspect** ➢ Three tiers (federal, provincial, local) of government agencies such as MOEWRI, DWRI, Department of Agriculture (DOA) under Federal government and MOWSIE, Ministry of Industry, Agriculture and Cooperatives (MOIAC), KIMO, AKC under Provincial government and 4 LGs have been involved in the Project. ➢ These governmental organizations have appropriate organizational structures for improving / developing irrigation or agriculture in collaboration with WUA. ➢ Frequent shift of officers and insufficient number of officers (for example, number of engineers in KIMO, and number of agricultural officer (or extension officers) in LGs) are organizational issues for continuous use of project outcomes within KIS and disseminating project outcomes to other irrigation schemes. ➢ Despite under such conditions, it is found that there is very good collaborative relationship among the stakeholders of the Project, especially at field level. ➢ It is very important to continue this collaborative relationship and it is necessary to create a coordination framework / system among stakeholders by appointing key coordinator(s) prospecting the termination of the Project. ➢ Therefore, the organizational sustainability of the Project will be moderate. **(3) Financial aspect** ➢ According to Nepalese side inputs, the Nepalese side allocated significant amount of budget the Project since FY 2021/22. ➢ The promotion of the irrigated agriculture has been conducted mainly in the area under 8 model secondary canals (SCs) in KIS. It is necessary to disseminate the Model of irrigated agriculture in remaining area of the scheme. There is expectation that the GON can allocate budget for the remaining area of the scheme. Therefore, financial sustainability for disseminating the Model for the remaining area of the scheme will be high. ➢ However, significant amount of budget is necessary for replicating the Model in other irrigation schemes in Terai. Therefore, financial sustainability for disseminating the Model will not be high in this case. ➢ Overall evaluation of financial sustainability will be moderate low. **(4) Technical aspect** ➢ In the course of the project implementation, the capacity of governmental officers and managerial persons of WUA has been enhanced through trainings, workshops, and training in Japan. ➢ Capacity building of WUA members was focused on persons concerned with 8 SCCs and farmers in the model area (in the coverage area of 8 SCC and their technical capacity has been strengthened. ➢ On the other hand, capacity building of SCC members and farmers in the remaining 14 SCs is limited (their capacity building is necessary). Other concerns for assuring technical sustainability are frequent shift of governmental officers and change of managerial persons of WUA (risk factors). ➢ Therefore, it can be said that the technical sustainability of the Project will be moderate.

Source: Terminal Evaluation Report (Oct. 2024), JICA Terminal Evaluation Team

<Conclusions>

As conclusion, although there are various issues affecting effective implementation of the Project activities, the JICA Terminal Evaluation Team has confirmed that there are positive outcomes of the Project. The degree of achievements of the Outputs and the Project Purpose is Very Well in general.

Most of the Project objectives and targets are achieved or to be achieved by the end of the Project at a very satisfactory level, the Project is terminated as planned in March 2025.

4.2 Recommendation by Terminal Evaluation Team

According to the Minutes of Meeting between Joint Secretary of MOEWRI and JICA Terminal Evaluation Team held on 2nd October 2024, the following recommendations were made to the Nepalese Counterparts (Minutes of meeting is attached in Attachment 3.4).

Table 4.2-1 Recommendation from JICA Terminal Evaluation Team to Nepalese Counterparts (C/Ps)

No.	Address	Recommendations
1	MOEWRI and DWRI, Federal Government	1) To facilitate to get approval of the Guidelines for the Promotion of Irrigated Agriculture Model in Terai (hereinafter referred to as "the Model") from JCC and afterwards from MOEWRI. 2) To make necessary budget arrangement and / or work towards obtaining financial support from development partners in order to replicate to other irrigation schemes in other provinces. 3) To nominate appropriate person from the KIS and other relevant irrigation schemes to participate in training in Japan (Knowledge Co-Creation Program) of [Operation, Management and Maintenance of Irrigation Facilities and Agricultural Land Infrastructure Development] and [Effective Participatory Irrigation Management and Capacity Building of Water Users Organization] as well as the third country training courses. 4) To ensure continuation of duty and role in the Project in order not to affect project activities when focal person transfers to other position.
2	MOWSIE	1) To prepare an Action Plan to replicate the Model in other irrigation schemes in Koshi Province. 2) To monitor the progress and achievement of the Action Plan to be implemented by Task Team in KIS regularly and provide necessary support for the effective implementation of the Action Plan. 3) To provide necessary financial support to promote the irrigated agriculture for remaining SCs of non-model areas in KIS. 4) To take lead role for replicating the Model to other irrigation schemes within the Koshi Province in collaboration with MOIAC, AKC, and LGs. 5) Facilitate the stakeholder meeting like PMC and Task Team to implement the Model activities to other irrigation schemes. 6) Ensure continuation of duty and role in the Project in order not to affect project activities when focal person transfers to other position.
3	Task Team (KIMO, LG, AKC and WUA)	1) To continue activities for improvement of the irrigated agriculture for remaining SCs of non-model areas in the KIS. 2) To prepare an Action Plan for three-years after the completion of the Project to continue the promotion of irrigated agriculture using the results of the Project and keeping stakeholder meeting. 3) To monitor the progress of the Action Plan regularly, report the progress to MOWSIE and JICA and take necessary actions for the effective implementation of the Action Plan.

Source: Minutes of Meeting for Terminate Evaluation Results (Oct. 2024), JICA Terminal Evaluation Team

4.3 Key Factors affecting Implementation and Outcomes

During the implementation of the Project activities in Stage-1 and 2, the Project activities and achievements were affected by the several unexpected external issues. The following table summarizes the external issues affecting the Project implementation during the Project period.

Table 4.3-1 Summary of Issues affecting the Project Activities and Achievements

No.	Issues	Time of Occurrence	Affected Activities
1	Restrictions to Experts to undertake field activities due to COVID-19	Late April 2021 to August 2021	1) Due to the government protocol and notice from JICA Nepal office, both Japanese and National experts were not allowed to move to the Project sites and conduct field level activities until August 2021. 2) During this period, only online meeting and communication could be conducted with the local C/Ps (Task Team). It delayed the overall Project implementation and progress of some activities.
2	Restrictions on physical meetings and workshops due to COVID-19 measures	September 2021 to January 2022	1) Due to the government protocol and JICA office guidelines, the number of participants for physical meeting and workshop should be minimized up to January 2022. This decreased the efficiency of workshops and training delivered to WUA members, extension workers and farmers. 2) Online training and meetings were held, but the local internet communication conditions and quality of services were poor. This made difficult to hold efficient meetings and training efficiently. However, TCP-PIAT experts and C/P officials did their best to maintain the quality of the services.
3	Stoppage of irrigation water supply due to rehabilitation of headworks, Main Canals (MCs) and SCs.	December 2021 to June 2022	1) KIMO has conducted rehabilitation works for the headworks from Dec. 2021 to Jun. 2022, which is winter and spring cropping season and KIMO needed to stop water supply to entire scheme during this period for the works. 2) Due to the stoppage of the irrigation water supply, the activities related to water distribution for winter and spring season in 2021-22 could not be carried out.
4	Limitation of KIMO engineer to participate in field activities due to the personnel transfer and others	April 2022 to September 2022 July 2023 to Jan. 2025	1) Chief of KIMO was transferred to other position in April 2022 and KIMO agriculture engineer was appointed as Acting Chief. New Chief was appointed in September 2022. 2) The focal person of KIMO was selected as a trainee for JICA overseas training program in Japan and absent from August to the end of September 2022. 3) Therefore, during the period from April to September 2022, there was limited number of engineers in KIMO and it was physically difficult for KIMO engineer to participate the field activities. 4) In addition, two KIMO engineers including focal person participated in abroad study in India for two years from July 2023. In KIMO, only Chief of KIMO and two sub-engineers are assigned during the remaining the Project period upto January 2025. This caused difficulties of participation of the field activities and training by KIMO engineer and staff.
8	Effect of local elections on field activities	April to May 2022	1) Municipal level local election was held in Nepal on May 13, 2022, and Japanese experts were not allowed to stay at the Project site during the election period (between May 10 and May 15, 2022) due to the safety reasons as per the JICA Nepal Office notice. 2) As per election code of conduct, no meetings and

No.	Issues	Time of Occurrence	Affected Activities
			workshops could be held in the field during election period in May. C/P officials, LG staffs and WUA officials were not only busy in election related works but instructed to restrict field activities and movement. 3) Many trainings and workshops were postponed till the completion of election to comply with GON order / election code of conduct activities.
9	National Election in Provincial and Federal and Government	November 2022	1) National elections at Federal and Provincial level were held on November 20, 2022. 2) Japanese experts were not allowed to stay at the Project sites before and after the election day as same as local election. 3) As a result, field activities were affected. Many trainings and workshops were postponed till the completion of election.
10	Postponement of election of WUA executive board members several times	November 2021 to February 2023	1) The term of office of the president and executive board WUA member of MCC, SCCs and TCCs has already expired in 2021, and it was necessary to conduct WUA election. 2) Election preparations have been discussed since November 2021, but it was postponed several times. 3) Initially, workshop on water distribution planning policy and collection of Irrigation Service Fee (ISF) were scheduled from January to March 2022, however, WUA requested to postpone the workshop until completion of election. 4) This postponement of WUA election affected the Project activities, especially capacity development to WUA MCCs and SCCs.

Source: JICA Project Team

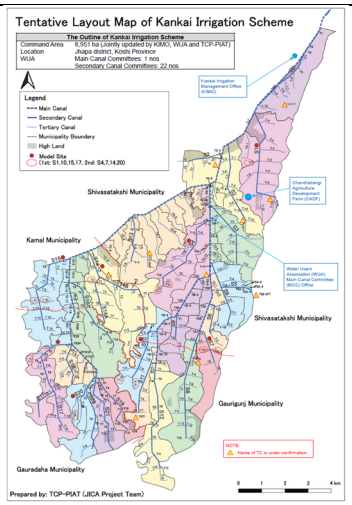
CHAPTER 5 GOOD PRACTICES AND LESSONS LEARNED

Several activities in the Kankai Irrigation scheme (KIS) under the Project had a high impact and good results. This chapter summarises these activities as "Good Practices and Lessons Learned" that could be used to scale up and replicate the model in other irrigation schemes.

<table>
<tr><th>Good Practice 1</th><th>Establishment of an Activity Cooperation System (ACS) for integrating irrigation and agriculture activities</th></tr>
<tr><td>ACS for Integrated Irrigation and Agriculture</td><td>
1) The Project formed a Project Task Team consisting of field-level stakeholders: Kankai Irrigation Management Office (KIMO), Water Users Association (WUA) and Local Governments (LGs) to implement activities.
2) The Project Task Team meeting was held regularly, at least once every three months, with a gap of no more than three months throughout the Project period. The team was chaired by the Chief of KIMO. The team shared the activities and progress, shared issues and constraints, and discussed further plans such as the selection of model sites, cropping plan, water distribution plan and demonstration activities for the upcoming next cropping seasons, including budget plan by model sites.
3) Chief / representative of Agriculture Knowledge Centre (AKC) was always invited in the Project Task Team meeting, though not included in the beginning but realized utmost necessary during the implementation. Linkage with the private sector for rice mill approach and introduction of modern technology such as demonstration of land levelling, rice transplanting, harvesting was discussed and planed in the meeting.
4) In the latter part, the meeting decided to shift the meeting venues so that the Mayor / Chairperson of the respective LGs could be invited as a chief guest in the meeting, get opportunity to brief him/her about the Project activities directly, strengthen further coordination with the LGs and other key staff, including vice mayors/vice chair-persons and chief administrative officers and enhance their further ownership after the termination of the Project. This was one of the exit strategies of the Project.
 
Task Team Meeting with Chairperson at Gauriganj Rural Municipality | Task Team Meeting with Mayor at Shivasatakshi Municipality
5) To ensure the continuation of the ACS, an Minute of Understanding (MOU) among the Project Task Team members was prepared and signed, clearly defining the roles and responsibilities of each Task Team member and shifting the responsibility of organizing Project Task Team meeting at the WUA, to be chaired by its chairperson, and secretary of the Main Canal Committee (MCC) to take the role of the member-secretary.
</td></tr>
<tr><td>Results and</td><td>1) Regular discussions among the Task Team members created a well-functioning and sustainable ACS. It provided a platform for integrating</td></tr>
</table>

Impact	irrigation and agriculture activities and undertaking several initiatives to promote irrigated agriculture, including the introduction of mechanical rice transplanting, levelling land through a laser land leveller, and changing the water distribution system from a yearly rotation system to a weekly rotation system. 2) The participation and understanding of the mayor / chairperson from the LG created the connection of irrigation scheme management by the LGs, which have not been observed before the Project. 3) Local government started to provide not only for support in agriculture activity but also in canal cleaning and canal protection works against the throwing the trash. It was also initiated that the LG would support for giving sanction to non- Irrigation Service Fee (ISF) payer within the jurisdiction. 4) As a result of this activity, Shivasatakshi Mayor could fully understand how agriculture machinery custom hiring service centre (CHSC)established in the WUA office was operating satisfactorily, which led him to announce that the LG will provide a rice transplanter and a combine harvester to the WUA to add in its custom hiring centre and rent to the water users. All LG chairs often said that the Project made them realize that the KIS is their own resource and brought LGs, irrigation and irrigation system together.
Lessons Learned for Replication to Other Schemes	1) The creation of an ACS and regular meetings at the field level, participated in by different agencies responsible for irrigation and agriculture, help integrate irrigation and agriculture and establish an effective collaboration and sustainable platform for achieving the results envisaged by both agencies and benefiting the end-users of the irrigation systems, which are the farmers. 2) Common challenges often observed in the irrigation systems, such as depositing domestic waste products and sewerages, low-ISF collection rates, diminishing interests and participation in canal cleaning, canal-bed encroachments could be addressed effectively and sustainably when LGs are proactively engaged in irrigation and agriculture-related activities through systems such as forming the Project Task Team together and ACS. Without Project Task Team and ACS may not produce envisaged results.

Good Practice 2	**Updating command area and preparation of irrigation system layout map using Q-GIS**
Irrigation Command Area Updating	1) As described in Chapter 3, the Project updated the irrigation command area in KIS up to tertiary canal (TC) level through preparation of irrigation system layout map using Q-GIS and field verification with WUA members.  Verification of canal alignment and location of head regulators with WUA members  Verification of canal alignment and boundary of command area with WUA members at field 2) Firstly, canal alignment of main, secondary canals (SCs) and TCs with boundary of command area were traced using free software Q-GIS based on the google earth and existing data such as Integrated Water Resources

	Management Project (IWRMP) report and existing irrigation scheme map. 3) Field verification was conducted with each WUA Secondary Canal Committee (SCC) and Tertiary Canal Committee (TCC) member to verify the canal alignment, canal name and boundary of command area. The coordinates were taken using GPS. The name and location of canals and water diversion structures (head regulator) were also verified through "Walk Through Survey (WTS)". 4) Alongside field verification, areas outside the command area, such as roads, residential areas, forests, and non-irrigated farmland, were identified on Q-GIS based on Google Earth imagery and interview results and subsequently excluded from the irrigation command area. 5) Based on the results of Q-GIS irrigation system layout map with command area boundary after field verification, the whole command area in KIS and individual command area of each SCC and TCC could be calculated.  **Figure 5-1 Updated Irrigation System Layout Map** **Table 5-1 Updated of Command Area at each SCC level** MC / SCC / Original Area*1 (ha) / Area by IWRMP*1 (ha) / Updated Area (ha)*3 R-I 0 UNK 268.0 319.2 R-I 1 736.1 460.0 509.2 R-I 2 251.4 324.0 443.6 R-I 3 372.0 277.0 335.7 R-II 4 417.5 315.0 368.5 R-II 5 798.0 258.0 371.2 R-III 6 136.1 93.0 101.2 R-III 7 230.2 154.0 263.7 R-III 8 UNK 292.0 467.3 R-IV 9 126.5 123.0 129.9 R-IV 10 259.3 152.0 263.6 R-IV 11 144.4 131.0 132.3 R-IV 12 UNK 246.0 383.1 R-V 13 UNK 214.0 228.4 R-V 14 UNK 347.0 602.9 R-V 15 UNK 390.0 420.4 R-V 16 UNK 330.0 379.4 R-V 17 UNK 343.0 416.7 R-V 18 UNK 112.0 161.9 R-V 19 UNK 158.0 213.2 R-V 20 UNK 179.0 332.5 R-V 21 UNK 163.0 211.7 DTOs 796.7 1,621.0 1,895.5 **Total** **7,000.0*2** **6,950.0** **8,951.1** *1 Source: "Draft Final Report on Main Irrigation Canal Operation Plan for Crops in Kankai Irrigation System", April 2016, IWRMP, p12-13 *2 Breakdown of 7,000ha is unknown (UNK). *3 It is under reiveiwing and checking.
Results And Impact	1) The command area of whole KIS was updated and identified. 2) Irrigation system layout map was prepared using Q-GIS. Q-GIS is free software and all government staff as well as WUA members can download and utilize, update and modify the irrigation system and command area map by Q-GIS. 3) By confirmation of the command area at each SCC and TCC level, it became possible to calculate water distribution discharge based on the command area and prepare the irrigation flow diagram.

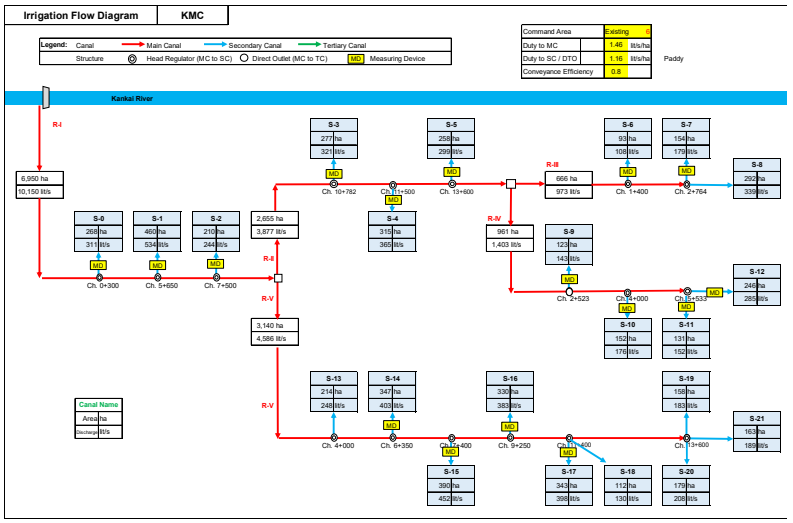
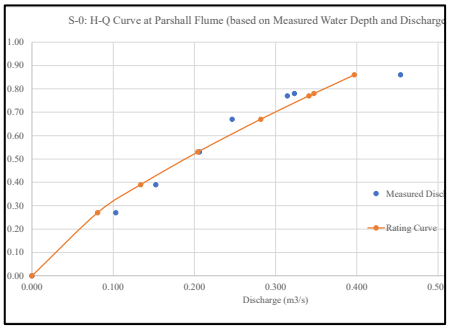


Figure 5-2 Irrigation Flow Diagram with Command Area and Distribution Discharge

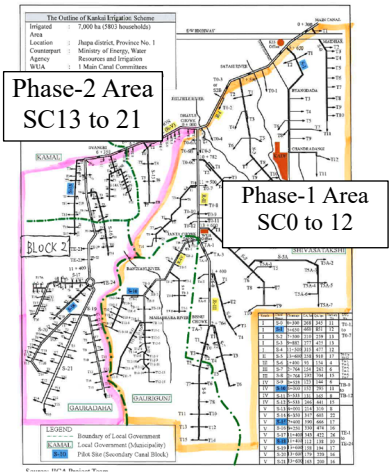
4) While only schematic layout map was available in the KIS before the Project, an irrigation system layout map at an actual scale was completed. This map supports KIMO and WUA in the operation, maintenance, and management of irrigation scheme.

Lessons Learned for Replication to Another Scheme	1) Accurate identification of command area and preparation of irrigation system layout maps are basic information for ensuring equitable water distribution, timely irrigation facility maintenance. The WUA may use it to improve ISF collection rate in the future. 2) However, preparation of system map and updating irrigated areas using Q-GIS requires trained and qualified Q-GIS expert. Therefore, WUA may not be able to undertake this activity without technical and financial support of the government, through the concerned Irrigation Management Office (IMO). 3) Since IMO and WUA should regularly update irrigation command area using Q-GIS or GIS, it is important for them to establish regular coordination and create internal capacity.

Good Practice 3	**Introducing water level marking at measuring device for equitable and transparency water distribution from main canals (MCs) toSCs**
Water Distribution Plan for Equitable Water Distribution	1) The Project conducted water discharge measurement at water measuring devices at beginning of **SC**s using current meter and prepared accurate Height-Quantity curve (H-Q curve). 2) Based on the H-Q curve and water distribution plan, the Project estimated the design water level at almost all measuring devices at **SC**s and marked water level by painting. In case of there was no measuring devices, measuring devices were newly constructed or water discharge measurement was conducted at flume section.

Water Distribution Plan for Equitable water Distribution	 Water discharge measurement by KIMO staff and WUA member at measuring devices  **Figure 5-3 Preparation of H-Q curve based on measurement data** 3) The Project also provide field training to KIMO gate operators to control gates to adjust the water level up the mark not beyond the marks. 4) Water distribution for monsoon seasons by continuous water flow, the water distribution discharge was controlled using water level by the gate operators.  Marking of water level at measuring devices  Control of water discharge by KIMO gate operators using water level marks
Results and Impact	1) According to the baseline survey results and interview to WUA SCC members, distribution discharge at upstream SCC such as SC-0, 1 was sufficient but at downstream SCCs such as SC-7, 8, 9, 10, 11, 12 and SC-17 to 21 was insufficient and water users at downstream could not receive canal water timely. 2) After introducing water distribution using water level mark, water distribution along MC has been improved and downstream SCCs could receive more water from canals according to the interview to downstream SCC chairman, even though it still needs more improvement. 3) According to the interview to KIMO gate operators, previously, due to the lack of standards, it was necessary to adjust water distribution discharge based on the request from WUA members. However, with clear standards now established, it has become possible to clearly explain them to the members.
Lessons Learned for Replication to Other Schemes	1) In case it was found there was unequal water distribution between upstream and downstream area along MC, introducing water distribution using water level mark is an effective improvement method. 2) Preparation of H-Q curve at measuring devices based on field water measurement requires skilled workers with special instrument like current meter and intensive works. It is necessary to consider outsourcing works to

	external parties, if it is difficult / overload for IMO staff to conduct the works. 3) Gate operators employed by the IMO or selected by the WUA should be assigned to operate the gates along the MCs.

Good Practice 4	**Change of rotational irrigation rule to upstream and downstream command area in Spring Season from yearly alternate rotation to weekly alternate rotation**
Changing Annual Water Alternative Distribution Within the Command Areas of MC's Different Reaches to Biweekly Basis	1) In previous practices for water distribution in spring cropping season, due to river water shortages from March to April, Phase-1 area (SC0 to SC12) and Phase-2 areas (SC13 to SC21) were irrigated alternately each year. 2) In the Project, a water balance calculation was conducted to determine the irrigable area during the spring season. Based on the results, discussions were held with KIMO and WUA members, and the irrigation rule was changed from annual alternation to alternating biweekly basis. 3) Before the start of spring cropping, the spring cropping area for each SCC was confirmed through the WUA, and water distribution rules were prepared accordingly.  **Figure 5-4 Rotation Block** <Previous practices> Block / Spring 2019 / Spring 2020 / Spring 2021 Phase-1 area (SC0 to 12) / No / Irrigation / No Phase-2 area (SC13 to 21) / Irrigation / No / Irrigation <After change> Block / 1st Week / 2nd Week / 3rd Week Phase-1 area (SC0 to 12) / Irrigation / No / Irrigation Phase-2 area (SC13 to 21) / No / Irrigation / No
Results and Impact	1) The previous practice of alternate seasonal rotation method in spring cropping season significantly discouraged farmers from cultivating spring crops, particularly spring rice. 2) Farmers in the areas not scheduled for irrigation rotation in a given year had to either keep the land fallow or get water from Shallow Tube Wells (STWs) if available. 3) With the change of rotation rule to a biweekly basis (or within the week, dividing early and late period), motivated farmers to grow crops during spring season, particularly grow spring rice. 4) However, given the limited availability of river water, it is necessary to explain the risk of water shortages from the canal in March and April if the rice cropping area continues to grow. Therefore, it is essential to confirm and adjust the cropping area during cropping plan period and to communicate that when river discharge is insufficient, STWs has to be used as a supplementary water source, or in conjunctive mode.

Lessons Learned for Replication to Other Schemes	1) Previous rotational irrigation practice was designed due to the shortage of water in the MC during the spring season without considering the possibility of conjunctive use of STW and surface irrigation, cropping intensity, of the unique to KIS area, but it could prompt other irrigation schemes to reconsider and optimize their irrigation practices. 2) It is essential for the IMO to collect historical river flow data and meteorological data and to calculate the irrigable area, particularly for the spring season, through crop water requirement calculation and water balance analyses.

Good Practice 5	**WTS along canals for preparing irrigation facility ledger (IFL) and annual facility maintenance plan**
WTS for IFL Preparation and Formulation of Facility Maintenance Plan	1) WTS was conducted for MCs and all 22 SCs and selected model TCs and non-model TCs during the Project period by KIMO staff, WUA SCC / TCC representatives with support by Japan International Cooperation Agency (JICA) Project Team, to assist WUA to prepare IFL.  WTS along MC by KIMO staff and WUA MCC representatives  WTS along TC by KIMO staff and WUA SCC representatives 2) The Project prepared the format of WTS and methodology. 3) During WTS, the following items were checked and recorded. <Irrigation Structure> i) Type and location of irrigation structure with coordinates by GPS ii) Condition of structure iii) Size of structure (approximate) <Irrigation Canal> i) Type of canal (concrete lining canal, unlined canal, flume etc.) ii) Location of Beginning Point and End Point of each canal type iii) Canal dimension (approximate) iv) Condition of canal 4) IFL with functional diagnosis were prepared in MC and SCs based on the WTS
Results and Impact	1) Based on the results of the WTS, an IFL with functional diagnostic for the MC were prepared, enabling the formulation of an annual maintenance plan. This helps KIMO to develop a prioritized repair plan for main facilities within the irrigation system. 2) WTS results for SCs were utilized for preparation of IFL and preparation of

	annual maintenance plan by SCCs. WUA SCC and TCC raised awareness of the ownership of maintenance of the canals through the activities.  Preparation of IFL with functional diagnostic  Preparation of maintenance plan of SCs by WUA SCC and TCC 3) Additionally, conducting the WTS with representatives of the water users' associations helped members understand the names of the irrigation canals and fostered a sense of ownership and responsibility as managers of the system. 4) Through the creation of awareness of importance of canal maintenance at tertiary level, participation of canal cleaning of WUA TCC member was increased.  Canal cleaning by WUA members  Canal cleaning by WUA members in collaboration with LG
Lessons Learned for Replication to other Schemes	1) The formulation of an IFL is essential information for the operation, maintenance, and management of irrigation facilities as well as for formulating annual maintenance plans. 2) Conducting WTS of the canals by IMO staff and WUA members provides an important opportunity not only to assess the condition of the facilities but also to mutually recognize their functionality, issues, and the importance of maintenance. 3) This practice should be implemented in other irrigation scheme as well. However, due to the high workload involved, the implementation method should be carefully considered by the local office.

Good Practice 6	**Transformation of from field-to-field irrigation to water distribution through field channel (FC)**
Facilitating	1) In KIS, although TCs have been developed, the majority of fields lacked FCs,

<table>
<tr><td>Water Users to Construct FCs</td><td>or destroyed that led farmers to apply fluffing system-based irrigation- irrigate from field to field.</td></tr>
<tr><td>for Improving Water Management</td><td>2) In KIS, although TCs have been developed, the majority of fields lacked FCs, or destroyed that led farmers to apply fluffing system-based irrigation- irrigate from field to field.
3) To address this issue, the Project motivated farmers to construct FCs on their own initiatives, particularly in the model sites. The locations and alignment of the FCs were determined by the WUA TCC representatives with members at the selected model sites, and the construction was carried out by the water users themselves.
4) KIMO supported the construction of TC structures, such as field outlets, in areas where FCs were developed.</td></tr>
<tr><td>Results and Impact</td><td>1) The Project set a target to construct 12 km of FCs as Project Design Matrix (PDM) indicators during the Project period and the target was achieved.
2) In the fields where the FCs were constructed, irrigation through the channels became possible, leading to improved water management at the field level.
3) This was particularly beneficial for irrigation during the winter and spring seasons, as it enabled the delivery of water to downstream fields even when fields near the TCs were not cultivated.
<table><tr><td>  </td><td>  </td></tr><tr><td>Construction of FC by water users</td><td>Water distribution through FC</td></tr></table></td></tr>
<tr><td>Lessons Learned for Replication to Another Scheme</td><td>1) Farmers are more likely to support construction of FCs when they are properly motivated, made aware of the benefits, and provided with essential support and services. For instances where a farmer is hesitant to allocate land for FC construction, fostering group consensus and leveraging peer influence can play a crucial role in promoting cooperation. This approach ensures equitable irrigation access for all neighboring farmers.
2) To effectively motivate water users to participate in the construction of FCs, the following issues must be addressed, and corresponding activities implemented concurrently:
i) Ensure water delivery to TCs: Canal water must reliably reach the TCs. Without this, water users will not perceive the need for constructing FCs.
ii) Secure consensus from landowners: Agreement must be obtained from landowners along the proposed FC alignment. This will require proactive leadership from SCC and TCC representatives and, if necessary, intervention by LG authorities.
iii) Promote active farmer participation: Farmers who will benefit from the</td></tr>
</table>

	FCs should be actively involved in the construction process to foster ownership and collaboration.

Good Practice 7	**Improvement of water use efficiency by introducing of land levelling**
Improving Water Use Efficiency	1) The Project procured tractor and laser land leveller and handed over to WUA MCC through KIMO. Land levelling demonstration were conducted at the demonstration farms in cooperation with AKC and Nepal Agriculture Research Council (NARC) /Directorate, Koshi Province, Tarahar. 2) In the KIS, many fields within plots are unlevelled, resulting in areas with varying water depths during water ponding, with some parts of the fields remaining above the water surface. Additionally, due to the original sloped terrain, many plots were divided into smaller sections with bunds. 3) Through land levelling operations, levelling within plots and the consolidation of smaller plots into larger ones were achieved. 4) During the Project period, levelling operations were conducted at the demonstration farms in February 2023 and February 2024. In collaboration with NARC, NARC operators transferred technical knowledge to water users' association tractor operators on how to use the equipment.
	 Land leveling at demonstration farm using tractor and laser land leveler  Land leveler stored in the garage of WUA office
Results and Impact	1) In the leveled fields, according to interviews with farmers, there were reports of reduced water usage and increase irrigation water efficiency. 2) Additionally, in the larger consolidated plots, the efficiency of operations such as plowing, using rotavators and transplanting using agriculture machinery improved.
	 Water distribution at levelled farmland  Interview to land levelling

	demonstration farmer
Lessons Learned for Replication to other Schemes	1) Land leveling is effective to contribute to improving water use efficiency in the fields in other irrigation scheme. 2) However, since land levelers are still not widely available in Terai, it is necessary to ensure the availability of such machinery. 3) Given the high cost of land leveling, provincial and LGs should offer a grant covering at least 75% of the costs. This grant should operate on a first-come, first-served basis, prioritize group farming initiatives, and include a conditional clause to recover the grant amount with interest if the funds are misused for land plotting rather than agricultural purposes.

Good Practice 8	**Promotion of agricultural mechanization for rice cultivation in KIS area**
Promotion of Agriculture Mechanization	1) The Project succeeded to introduce mechanical rice transplanting for the first time in Kankai command areas of Shivasatakshi, Gauriganj and Gauradaha Municipalities, due to technical and financial support availed by the AKC, as part of the ACS. The farmers received rice seed through Arzoo rice mill which the mill would buy. Combine rice harvester and technical guidance were provided by the mill, and AKC's support to lease rice transplanter through a CHSC established by a cooperative expedited the lease process. Technical training was provided by AKC to the interested farmers of the model sites before sowing seeds on the plastic tray. < Introduction of mechanical rice transplanters for spring rice cultivation > i) Collaborator: AKC, Nepal Multipurpose Cooperative (NMC), Arzoo Rice Mill ii) Initiated in the first introduction: 2024 Spring Rice iii) Target: More than 40 farmers in all 4 LGs

	
Mechanical rice transplanting using NMC's transplanter	Rice seedling prepared in plastic tray for mechanical transplantation

< Mechanical harvester>
i) Collaborator: AKC, NMC, Arzoo Rice Mill
ii) Initiated in: the first introduction: 2022 Monsoon Rice

Mechanical harvester

Mechanical harvester in Spring Season

2) A Community CHSC was established by the WUA to improve water users' access to agricultural machinery. Field-based on the site training programs were conducted by Agribusiness Promotion Support and Training Centre (ABPSTC) to promote the adoption of agricultural machinery to WUA members, in collaboration with the AKC.

Establishment of CHSC in WUA, which initiated the operation in 2021/22

Agriculture mechanization training conducted by ABPSTC in 2023

Results and Impact	1) Agricultural mechanizations were introduced to KIS farmers. 2) According to the interview to demonstration farmers for mechanical rice transplanter, the cost of transplanting was reduced around 40 to 50% from manual rice transplanting. In addition, the time for transplanting was significantly saved by 50 to 60%. 3) Similarly, the cost of rice harvesting cost was reduced around 50 to 69% from manual harvesting. In addition, the time for harvesting was significantly saved from 40 to 50%.
Lessons Learned for Replication to Other Schemes	1) In the Terai region, particularly in irrigation schemes, the aging of the agricultural workforce and the increasing cost of seasonal labour are critical challenges. This has led to a growing need for mechanization to sustain productivity and reduce the heavy reliance on manual labour.

	2) **Capacity Building and Training**: For mechanization to succeed, there needs to be a focus on building the capacity of farmers to operate and maintain agricultural machinery. Providing training programs on how to effectively use machinery, maintain it, and integrate it into the farming system is crucial. 3) **Access of small farmers** to the agricultural machines is an issue which can be solved if LG supports the establishment of agricultural CHSC, with sound management, transparency and good governance. 4) **By linking CHSCs** with local traders and processors, such as rice mills, agricultural mechanization can be further integrated into the broader agricultural supply chain.

Good Practice 9	**Establishment of polyhouse nurseries for promoting market-oriented agriculture focused on vegetable crops**
Polyhouse for the Preparation of Vegetable Seedings to Promote Market-Oriented Agriculture	1) Through collaboration with AKC, LGs and commercial agriculture farm near KIS, several modern agricultural technologies such as shown below were introduced to the farmers for vegetable production in winter and spring season through demonstration.  Polyhouse nursery demonstration initiated in 2022/23  Polythene mulching in capsicum farm initiated in 2022/23 2) Demonstration was conducted with the leaders' farmers selected in each model sites and it was disseminated with other surrounding farmers. 3) Cost for the materials was supported by LG around 50 to 75% as per the rule of the LG. Remaining was borne by the farmers.
Results and Impact	1) The introduction of polyhouses enabled farmers to produce vegetable seedlings for the upcoming winter season from the end of monsoon season around September. By adjusting the cropping schedule and harvest time, they could sell vegetables at higher prices during the Dashain and Tihar festivals. 2) The adoption of mulching sheets made it relatively easier for farmers to cultivate high-quality vegetables. This success was not limited to demonstration farmers; surrounding farmers also experienced the benefits, leading to a yearly increase in the number of farmers using these technologies. 3) Among the model farmers, an increasing number are expanding their vegetable cultivation areas year by year.
Lessons Learned for Replication to Other Schemes	1) Some farmers in Terai primarily focus on rice / cereals cultivation and have limited experience with commercial vegetable farming. 2) Supporting the new agricultural material and dissemination of these materials, combined with field guidance, contributes to the expansion of vegetable cultivation areas and an increase in farmers' incomes.

Good Practice 10	**Adaptation of Sindhuli Road Corridor Commercial Agriculture Promotion Project (SRC-CAP) Approach with customization based on climate and geographic condition of KIS**
Adaptation of the SRC-CAP Approach	1) The Minutes of Meeting on the amendment of the Record of Discussion (R/D), signed between Ministry of Energy, Water Resources and Irrigation, Koshi Province (MOEWRI) and JICA on October 29, 2020, included the utilization of the Commercial Agriculture Promotion (CAP) approach developed in SRC-CAP as part of the introduction of market-oriented agriculture in the KIS. However, since the geographic and agro-climatic conditions, as well as the cropping patterns, differ significantly between the SRC-CAP site and KIS in the Terai, it was necessary to customize the approach of market-oriented agriculture to fit Terai. 2) At the beginning of Phase-2, an analysis was conducted to compare the differences between the SRC-CAP site and the KIS, and a concept paper for the CAP approach applicable to the Terai region was prepared. 3) CAP training was conducted in two stages Firstly, Training of Trainers (TOT) for CAP approach was conducted to agriculture officers of the LG by MOAIC, AKC and JICA Project Team. Those officers provided training to the selected model farmers including orientation. 4) CAP training to farmers was conducted in the following steps as per CAP approach. Step 1: Farmers understand the goal through the CAP orientation Step 2: Farmers' awareness is raised through market survey, advanced farms visit, etc. Step 3: Farmers make decision through crop selection, crop cultivation and sales planning Step 4: Farmers acquire skill of cultivation and sales through on-site coaching by the agriculture officers and AKC staff

CAP Training to Agriculture Extension Officers

CAP Orientation to Farmers Group by Agriculture Officers of LG (Step-2)

Market Survey by Farmers group (Step-2)

Introduction of New Skills / On-site Coaching on Vegetable Cultivation (Step-4)

Guidance by Agriculture Officer of LG to Farmers on Producing Organic Fertilizer Using Manure (Step-4)

Guidance by Agriculture Officer of LG to Farmers on Vegetable Seedling (Step-4)

5) Initially, the focus was on introducing vegetable cultivation for the winter and spring seasons. However, it became clear that spring rice cultivation was also an important crop for market-oriented agriculture in Kankai. Therefore, the scope of activities was expanded to include the promotion of cooperative sales of spring rice cultivation. To secure markets for spring rice, collaborations between WUA and a rice mill firm were established.

Workshop at Arzoo Rice Mill

Interaction between Representative of Arzoo Rice Mill and WUA Member

6) Price assurance for Spring Paddy Sales: Collaboration with the private sector was strengthened, and purchase agreements with the rice mill firm (Arzoo Rice mill) were established, ensuring guaranteed high prices for spring paddy.

Results and Impact	1) The target model farmers' agriculture income per Households (HHs) increased by 166% because of the introduction of market-oriented agriculture. 2) The new technologies and agricultural materials for vegetable cultivation were expanded not only to model farmers but also to surrounding farmers,

	contributing to increased production and improved quality of vegetables. The LG continues to provide technical and material supports. 3) Training in other advanced commercial farmers was highly effective, providing them with the opportunity to learn the same materials and new farming methods. 4) The introduction of market-oriented agriculture for spring rice increased farmers' motivation, leading to expand planting areas and increase their incomes.
	 Vegetable Cultivation Farmer in SC20  Increase of Spring Rice Cultivation
Lessons Learned for Replication to other Schemes	1) A market-oriented approach tailored to the local socio-economic conditions, geography and farming system, with the formulation of business plans including the marketing, helped farmers to adopt market-oriented agriculture. 2) AKC and LGs should collaborate to expedite market-oriented agriculture, including information sharing. Farmers should be made aware to adjust sowing time so that they would not end up producing those crops when the supply of that crops is maximum in the market. 3) Visiting farmers practicing market-oriented agriculture in nearby areas is very effective. It is necessary to survey whether there are model farms in the target area's vicinity. 4) Collaboration with the private sector is also essential for securing markets of agriculture produces. The establishment of such value chain platforms of the produces is required.

Good Practice 11	**Creation broad vision of WUA through and awareness raising and capacity building**
Institutional Development and Capacity Building of WUA	1) The key concept of the Project is that activities should be centred on WUA and water users. The active involvement of the WUA is essential in all the Project activities related to irrigation, market-oriented agriculture, and institutional development. 2) Through implementation of various activities and engagement with members, the Project has worked to foster a shift in mindset among members, enhance individual and organizational capacities, and establish institutional frameworks.
Results and Impact	1) Before the implementation of the Project, the activities of WUA primarily focused on canal cleaning, coordinating water distribution among members and ISF collection. 2) Through the Project's activities, the WUA has transformed into a central organization for promoting irrigated agriculture in KIS. It now plays a pivotal

	role in improving agricultural production and income for its members, serving as a liaison for collaboration with the private sector, coordinating with KIMO and LGs, and requesting necessary support. 3) Additionally, through on-site activities, representatives and members of SCC and TCC levels have been made aware of their roles, responsibilities, and identity as association members. This has fostered a sense of ownership and active participation in WUA initiatives.
Lessons Learned for Replication to Other Schemes	1) It has been confirmed that the irrigation promotion activities after the Project will continue, led by the beneficiary water users' association, and an MOU has been signed with the Task Team. 2) However, the current water users' association leaders were elected in April 2023, and many have only about a year of experience with activities during the Project period. Additionally, many leaders and associations have not yet developed the awareness to take the initiative in implementing the activities.

CHAPTER 6 THE RECOMMENDATION FOR THE ACHIEVEMENT OF OVERALL GOALS

Through the activities of the Project in the Kankai Irrigation Scheme (KIS), a PIAT-model for promoting irrigated agriculture in the Terai has been established, and drafts of guidelines and manuals have been formulated. These guidelines and manuals would help the relevant agencies of the Government of Nepal (GON) to scale up and replicate the model. This chapter provides the Project's recommendations to achieve the overall goal of the Project, which is to replicate the model in other irrigation schemes in Terai.

6.1 Approval of the guidelines and manuals by the federal government

To promote replication of the PIAT model nationwide, it is essential that the formulated guidelines and manuals be approved by the federal government, specifically the Ministry of Energy, Water Resources and Irrigation (MOEWRI) and the Ministry of Agriculture and Livestock Development (MOALD). Additionally, these documents should be disseminated to relevant stakeholders, including federal, provincial and local governments. The model is consistent with the National Irrigation Policy.

Since the contents of the guidelines and manuals were approved by 6th Joint Coordination Committee (JCC) meeting held in January 2025, it is recommended that the necessary approval processes within the government be pursued moving forward.

6.2 Approval of Three-year action plans, prepared by Task Team in KIS and the stakeholders in Chanda Mohana, by the concerned government agencies

Based on the recommendation by Japan International Cooperation Agency (JICA) Terminal Evaluation Team, a three-year action plan was developed by the Task Team to ensure further dissemination and continuation of activities in KIS through the Output 4 activities. Additionally, to replicate the model to other irrigation schemes, an action plan was formulated in Chanda Mohana Irrigation Scheme (CMIS) by the relevant stakeholders, including Chanda Mohana Irrigation Management Office, Agriculture Knowledge Centre (AKC) Sunsari, Chanda Mohana Water Users Association (WUA), and local governments.

These action plans not only outline activity schedules but also include necessary budget allocation for each agency. While both action plans were endorsed by the 6th JCC meeting, subsequent budget approvals and implementation by the respective agencies will be necessary. Furthermore, the establishment of Task Teams responsible for implementing activities in CMIS, as well as the formation of monitoring committees, will be required moving forward.

6.3 Selection of the Irrigation Schemes in Terai

To ensure the model's rapid success with visible results, selecting a simple, small, and well-functioning irrigation scheme is essential. However, the ultimate objective of the PIAT model goes beyond quick wins; its long-term aim is to achieve sustainability and transformation, shifting the system from a negative to a positive trajectory. For this reason, it is recommended that federal, provincial, and local agencies select irrigation schemes other than KIS and CMIS including farmers managed irrigation

schemes where the model will be introduced. An intensive field study will be required to finalize the system for replication.

The transformation being sought is not just incremental but systemic, much like the shifts witnessed in Nepal's Terai irrigation systems, where successful pilots have sparked large-scale adoption. For true change, however, it is vital that the scheme selected has the capacity to maintain momentum and foster broader impact. To achieve this, the following criteria are critical for selecting the appropriate scheme:

(a) Willingness of the concerned WUA and their demands

(b) Increase Irrigation Service Fee (ISF) collection rate in the scheme

(c) Promote market-oriented agriculture based on local agriculture potentiality

(d) Condition of the water resources facilities

6.4 Creating synergy by forming a platform for joint action

While the model may seem straightforward at first glance, its true complexity lies in uniting diverse stakeholders—each with their own objectives—onto a common platform. Creating synergy among these varied interests to drive collective impact is no small feat. It demands strategic coordination, effective communication, and sustained engagement to transform this initial collaboration into meaningful, lasting results. Without this foundational year of planning, the model's potential for transformative success could be significantly compromised. The planning phase provides a good opportunity to foster collaboration that leverages each stakeholder's strengths, so their collective efforts produce results greater than the sum of individual contributions. This builds mutual understanding, trust, and cooperation, ensuring all stakeholders work cohesively towards common goals. It's about turning individual actions into coordinated efforts that generate more impactful and sustainable outcomes.

6.5 Fund management

Implementing a Project without adequate fund is simply not possible. However, the cost-estimate presented in the Chapter 7 of the guidelines clearly illustrates that the model is not so much demanding from the perspective of financial resources requirements. Like any other development model, its success hinges on robust monitoring and strict adherence to a results-based management system. Therefore, the model calls for effective fund utilization with transparency and accountability.

6.6 Providing a high priority on the capacity development of WUA

As a farmers' organization with a larger membership with involvement in one of the most important commodities, water, the role of WUA is vital in the PIAT model. The Project initiative in KIS highlights the need for adequate support and assistance for the WUA, emphasizing its transformation into a professional, innovative and users-centred organization. While the WUA is primarily responsible for managing the irrigation system, it should also actively participate in agriculture commercialization-efforts. The PIAT model provides a platform to enhance governance within the WUA, ensuring it is more responsive to the needs of its users.

6.7 Engagement of private sector

Terai agriculture is private led. Private sector's dominance in the technology development, transfer and utilization, particularly in supply chain management is obvious. This sector can play a significant role in influencing WUAs and contributing to agricultural commercialization through mechanisms such as

investing in irrigation infrastructures, developing, transferring and utilizing irrigation technologies, collaborating with WUAs in introducing high-value crops that require irrigation. Therefore, this guidelines reiterates the importance not only strengthening the relationship but also implement collaborative activities between WUA and the private sector in promoting market-oriented agriculture. The KIS experience suggests that the WUAs should be highly proactive in strengthening partnerships with the private sector and cooperatives. Some collaborative activities caried out by WUA with the support of the TCP-PIAT are listed below:

1. Promotion of spring rice using mechanical rice transplanters
2. Participation in spring rice farming for facilitating contract agreements between the farmers (water users) and Arzoo Rice Mill
3. Establishment of Agriculture Machinery Custom Hiring Service Centre (CHSC)
4. Using combine harvester for harvesting rice