

Technical Cooperation Project for the Promotion of Irrigated Agriculture in Terai Plain



"Maximum Use of Water, Grow for Sale"

Government of Nepal Ministry of Energy, Water Resource and Irrigation

Kankai Irrigation Scheme Baseline Survey Report

Kankai Irrigation Management Office Technical Cooperation Project for the Promotion of Irrigated Agriculture in Terai Plain **Project Task Team**

February 2022

TECHNICAL COOPERATIN PROJECT FOR THE PROMOTION OF IRRIGATED AGRICULTURE IN TERAI PLAIN

PROJECT LOCATION MAP



Source: JICA Project Team



TECHNICAL COOPERATION PROJECT FOR THE PROMOTION OF IRRIGATED AGRICULTURE IN TERAI PLAIN, PHASE-2 (TCP-PIAT, PHASE-2) "MAXIMUM USE OF WATER, GROW FOR SALE"



PRESENTATION ON BASELINE SURVEY RESULT



21 Jan 2022 Presented by Task Team

1. Introduction

The overall purpose of the baseline survey

To provide the basis for a "before" and "after" assessment or "change over time" assessment to set an indicator of Project Design Matrix (PDM). To get the basic data and analysis of the Project area.

> This survey uses participatory approach

The Project Task Team played active role in providing responses to the questions and/or analyse the data as per the structured interview schedule.

-Online Interview with KIMO -Online Interview with MCC -Field Interview with 22 SCCs -Field Interview with Individual Farmers

- Total respondent: 334 households
- ✓ From each SCCs, 15 to 17 households are selected to grasp the current situation of the whole Kankai Irrigation Scheme.
- ✓ The balance of area in TCC (Head Middle, Tail end) is also considered.



- > Output 2: Irrigation (cropping pattern, water availability, O&M activity, ISF etc.)
- > Output 3: Agriculture (crop by season, cultivated area, input, marketing etc.)
- Others: Basic data of KIMO & MCC (role & responsibility, etc.), Basic information of KIS farmer (occupation, income, land holding size, etc.)

Due to time limitation, this presentation focuses on the data related with PDM indicator and the related data.





4. PDM Indicator

Output	Objectively Verifiable Indicators
Output 2	1)Formulation of water distribution plan up to tertiary level,
1) Improvement of Water Distribution	based on the cropping calendar and its implementation
Planning and Implementation	2)Constructions of oo field channels
2) Implementation of appropriate facility	3)Formulation of facility maintenance plan and its
maintenance	implementation
3) Construction of Field Channel with	4)Increase of annual irrigated area by oo %
division box etc. (On Farm Development)	5)Increase of Irrigation Service Fee (ISF) collection rate by 00%
Output 3	1)Increase of targeted farmers' agricultural incomes of by 00%
Practice of Market-oriented Agriculture	2)00% of farmers make farm business plan and perform the
	market oriented activities based on the plan
Output 4.	1) Number of cooperation activities and these contents based
1) Establishment of Kankai Model for	on the results monitoring
improvement of irrigated agriculture	2)Formulated drafts of guidelines and manuals
2) The model are diffused to other	3)Number of trainings, training participants, and the level of
irrigation schemes in Terai area through	understanding
the trainings.	

5. The Current Situation of PDM indicator

Output 2:

1) Formulation of water distribution plan up to tertiary level, based on the cropping calendar and its implementation

Currently, there is no formal written document which indicates Main Canal, Secondary Canal, Tertiary Canal wise water distribution but they have some kind of internal rule for water distribution.

Farmers feel that water distribution plan is necessary for equitable water distribution based on cropping calendar.

Have you prepared and utilized water distribution plan by seasons (irrigation schedule)?



5. The Current Situation of PDM indicator

Output 2:

2) Constructions of oofield channels

There are many field channels in all SCCs, constructed by water users. The current number of field channels are not known. The JICA Project Team will provide the technical assistance to the Project Task Team for the construction of field channel.



Field Channel Constructed by Water Users in SC 10 (prior to the Project)

5. The Current Situation of PDM indicator

Output 2:

3) Formulation of facility maintenance plan and its implementation

Facility	Responsibility	Current Situation		
Headworks, Main Canal	KIMO	Annual maintenance plan is prepared but not for long-term maintenance Plan		
SC/TC/DTO	SCC/TCC /DTOC	No maintenance plan (However, there is some kind of internal plan for repair /rehabilitation shared within SCCs/TCCs/DTOCs)		
Do you kno maintenan prepared b SCC/TCC3	bw facility ce plan by your	No Yes No Yes Provide SCC Non Model Total (n=40) (n=25) (n=269) Total (n=334)		

5. The Current Situation of PDM indicator

Output 2:

4) Increase of annual irrigated area by $\circ\circ\%$



Percentage of Average Irrigated Area in KIS (FY 2019/2020, 2020/2021)

2) There is a necessity to increase the irrigated area in both of winter & spring season.

5. The Current Situation of PDM indicator

Output 2:

5) Increase of Irrigation Service Fee (ISF) collection rate by $\circ\circ\%$

The current command area was not updated regularly so the total ISF to be paid by all water users could not be confirmed (GIS analysis is undergoing).

<Condition for Estimation of ISF Collection Rate> The command area of KIS: 6,950 ha (KIMO, Asset Management Plan 2017) Rotation Area in Spring Season: FY 2018/2019, 2020/2021 is 3,408 ha (SC 0, 13 to 21), FY 2019/2020 is 3,810 ha (SC 0 to 12) Irrigation Service Fee: NPR 450 /ha /season (WUA, By-law)

	Rainy Season	Spring Season	Estimated Total ISF to be paid	Actual Collected ISF	Tentative ISF Collection Rate
FY 2018/2019	6,950 ha	3,408 ha	NPR 4,661,100	NPR 1,751,216.00	37.6%
FY 2019/2020	6,950 ha	3,810 ha	NPR 4,842,500	NPR 1,414,681.75	29.2%
FY 2020/2021	6,950 ha	3,408 ha	NPR 4,661,100	NPR 1,617,183.00	34.7%

5. The Current Situation of PDM indicator

Output 3:

1) Increase of targeted farmers' agricultural incomes by 00%

TCP-PIAT target farmers are who join in CAP approach activity from Model SCCs /TCCs. The income of target farmers are to be determined after the final selection of target farmers (the survey is undergoing).

5. The Current Situation of PDM indicator

Average Household Income in FY 2019/2020, 2020/2021



5. The Current Situation of PDM indicator

Output 3:

2) 00% of farmers make farm business plan and perform the market oriented activities based on the plan

<References>

Percentage of Household who have prepared Farm Business Plan



Almost all famers don't prepare the business plan before stating cultivation.

THANK YOU VERY MUCH COMMENTS AND SUGGESTIONS PLEASE



Annex: Condition of Individual Survey

No. of Respondent, Gender by SCC



Annex: The Current Situation of Other Essential Information

Percentage of Household Main Occupation Type



Annex: The Current Situation of Other Essential Information

Average Land Area of Household



Annex: The Current Situation of Other Essential Information

Cropping Calendar

Have you prepared cropping calendar in advance and utilised last year?

	Model TCC (%)	Model SCC (%)	Non Model SCC (%)	Total (%)
Yes	0.0	0.0	1.0	0.9
No	100.0	100.0	99.0	99.1

Almost all respondents did not utilised cropping calendar.



 76.7% of the respondents felt the availability of canal water as "Adequate" or "More than adequate", while almost all respondents cultivated land.

2) SC 5, 6, 10 and 11 (the tail end of phase1) and SC 13 to 21 (developed in phase 2) have high proportion in "Not water at all" and "Not adequate"

Annex: The Current Situation of Other Essential Information

SC-wise Percentage of Respondent Water Availability in Winter Season



1) 237 respondents (76.0%) felt the provision of canal water is "Not adequate" or "Not water at all", while 93.4% of the respondents cultivated land.

2) SCC located upstream (e.g. SC 0,1,13,14) are satisfied in the water distribution.

Other findings: A differences of water availability was found in the same SCC. Irrigated area from canal (98.36 ha) is less than spring season (128.18 ha).



 More than 50% of the respondents from SC 0, 13 to 21 answered as "More than adequate" or "Adequate" except for SCC 15, 19 and 20. (SCC,0 11 to 22: 89.8% of the respondents cultivated land)

- 2) SC 1 to 6 might take the irrigation water from canal
- Other findings: Shallow tube well is used where irritation water is not available (32.6% of respondent).

Annex: The Current Situation of Other Essential Information

Percentage of Coverage area and Household cultivating Rice in Rainy Season



Annex: The Current Situation of Other Essential Information

Percentage of Coverage Area and Household cultivating Major Crops in Winter Season



Annex: The Current Situation of Other Essential Information

Percentage of Coverage Area and Household cultivating Major Crops in Spring Season



Annex: The Current Situation of Other Essential Information



Annex: The Current Situation of Other Essential Information Percentage of Household using Agricultural Input for Rainy Season





Annex: The Current Situation of Other Essential Information

Percentage of Household using Agricultural Input for Spring Season



Annex: The Current Situation of Other Essential Information Percentage of Household Sales Place for Cereal and Vegetables Vegetable Cereal Farmgate House Village market Damak market Birtamode market Town/City market Consumed by Household 20 40 60 0 80 100 Percentage (%) (n=334, Multiple answers are allowed)



0

20

40

Percentage (%)

60

80

100

(n=334, Multiple answers are allowed)

Annex: The Current Situation of Other Essential Information Percentage of Household receiving Services from Municipality



Annex: The Current Situation of Other Essential Information Percentage of Household receiving Extension Advisory Services



Annex: Feedback to the Project Activities (Irrigation Activities)

- According to the interview on individual farmers for the status of irrigated area and water availability, it is found that there is unequal water distribution between the upstream secondary canals and downstream canals. Water distribution from main canal to secondary canals and DTOs are under responsibility of KIMO. It needs to prepare the water distribution plan at least from the main canal to secondary canals based on the cropping calendar and control water discharge by KIMO.
- 2) There is no clear picture about the command area of KIS for proper planning. A joint work of WUA, municipalities, KIMO and JICA Project Team can determine the actual command area of KIS by using the latest IT technology (e.g., GIS)
- 3) It is also not clear the irrigation system diagram in the whole KIS up to tertiary canal level with the name of the canal, location of the water diversion structure (e.g., cross regulator, head regulator) and command area. KIMO has layout map of KIS, however the name of tertiary canals and DTOC are needs to be confirmed through joint walk through survey and to be shared with WUA.
- 4) It is necessary to reinform all water users of the ISF collection rule: WUA members, who are in the alternate seasonal rotation area in the respective year, have to pay ISF. And it is recommended that the rule should be clearly written in By-law of WUA.

Annex: Feedback to the Project Activities (Irrigation Activities)

- Reliable database of users and land holdings is necessary for the ISF collection. A massive step on this issue must be launched together with all stakeholders of KIS.
- 6) For the strengthening of SCCs, orientation and basic practical training like account keeping, organizational development, irrigation technology are necessary.
- 7) There is gap of level of irrigation facilities between Phase-1 area (SC 1 to SC 12) and Phase-2 area (SC 0 and SC 13 to SC 21). In order to solve the above problems and establish equal water distribution in whole KIS area, it is necessary to make same level of irrigation facilities such as installation of head regulator and cross regulator gates, construction of tertiary canal and installation of measuring devices at least all secondary canals. The inventory data of irrigation facilities updated by joint walk-through survey and mid-term budget plan for the above works are required.
- 8) There are either no provision of stoplog and gate at diversion structure along TC and division box along field channel. Stoplog should be provided in necessary places by farmers themselves for efficient water distribution in on-farm level.

Annex: Feedback to the Project Activities (Agriculture Activities)

- A cereal-based farming system dominates the KIS area. However, there is a need for the farmers to transform their conventional farming system into commercial and prioritize to grow high-value commodities like vegetables by integrating with the needs and demands of the market.
- 2) Several opportunities exist in and around four municipalities to increase the productivity of cereal crops, get technical advisory services, and link with the markets. Therefore, the Project, with the support of the Project ask team members (KIMO, municipalities, WUA), will need to deliver technical assistance to the farmers to enable them to benefit from such opportunities.
- 3) Shortage of agricultural labour is the real problem of the farmers in the KIS area. Therefore, agricultural mechanization could provide one effective solution to this problem.

Annex: Feedback to the Project Activities (Integration of Irrigation and Agriculture Activities)

- Cropping calendar in the whole Kankai Irrigation System in three cropping season need to be
 optimized considering the key factors of i) water availability, ii) required cultivation period, iii)
 profitability. At present, many farmers are cultivating the spring rice in spring season and KIMO/WUA
 apply the alternate seasonal rotation. However, the irrigation water is not available for cultivation of
 spring paddy in the whole rotational area due to the limitation of river discharge. The promotion of
 maize production or other commercial crops in winter /spring season with increase of cultivation area is
 one of the recommended solution.
- 2) Since farmers cannot take water from canal during the cleaning and maintenance period, annual cropping calendar shall include such a period.
- 3) Given that many other alternative crops are available for the spring season, the cropping intensity and water utilization rate could be increased if farmers who grow any crops in the spring season using the KIS canal pay ISF twice, not limiting to spring rice only.

Annex: Feedback to the Project Activities (Integration of Irrigation and Agriculture Activities)

- 4) There is a strong need for the effective coordination among KIS key stakeholders (WUA, KIMO, SCCs, TCCs, LGs) to increase the regularity, reliability, and responsiveness in the equitable water distribution system in the canal irrigation system (MC, SCs, TCs, DTOs and field channels), and to assist farmers/water users to maximize the use of irrigation water to increase the productivity of water and crops so that the farmers could increase their income.
- 5) A technically sound irrigation system alone does not ensure optimum and efficient water utilization. Due to several socio-economic and marketing constraints including timely delivery of technology transfer services, many farmers are not able to access agricultural inputs for farming or selling their products. Water is necessary but not adequate to increase productivity and increase income of farmers. Therefore, the Project with the unified support of the Project Task Team members, province governments, specifically MoLMAC and MoPID, assist the farmers to integrate crop and water management through capacitated WUA.

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GOVERNMENT OF NEPAL TECHNICAL COOPERATION PROJECT FOR THE PROMOTION OF IRRIGATED AGRICULTURE

IN TERAI PLAIN

BASELINE SURVEY REPORT

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AKC	:	Agriculture Knowledge Centre
BLS	:	Baseline Survey
DADO	:	District Agriculture Development Office
DTO	:	Direct Tertiary Outlet
DTOC	:	Direct Tertiary Outlet Committee
FY	:	Fiscal Year
GDP	:	Gross Domestic Product
GIS	:	Geographic Information System
GON	:	Government of Nepal
GPS	:	Global Positioning System
HH	:	Household
IMTP	:	Irrigation Management Transfer Project
ISF	:	Irrigation Service Fee
IWRMP	:	Irrigation and Water Resources Management Project
JICA	:	Japan International Cooperation Agency
JS	:	Joint Secretary
KIMO	:	Kankai Irrigation Management Office
KIS	:	Kankai Irrigation Scheme/System
MC	:	Main Canal
MCC	:	Main Canal Committee
MOEWRI	:	Ministry of Energy, Water Resources & Irrigation
MoLMAC	:	Ministry of Land Management, Agriculture and Cooperative
MoPID	:	Ministry of Physical Infrastructure Development
NARC		Nepal Agricultural Research Counsel
NGO	:	Non-Government Organization
NPR	:	Nepalese Rupees
PMAMP	:	Prime Minister Agriculture Modernization Project
SC	:	Secondary Canal
SCC	:	Secondary Canal Committee
TC	:	Tertiary Canal
TCC	:	Tertiary Canal Committee
TCP-PIAT	:	Technical Cooperation Project for Promotion of Irrigated Agriculture in Terai Plain
WUA	:	Kankai Canal Water Users Association

Acronyms and Abbreviations

CHAPTER 1 INTRODUCTION

In Nepal, agriculture is a key industry that accounts for about two-thirds of the total population and accounts for about 30% of the gross domestic product (GDP) (*Nepal Ministry of Finance Economic Survey, 2018/2019*). Approximately 47% of the population below the poverty line is engaged in the agricultural sector, and agricultural and rural development has a great role to play in terms of economic development, poverty reduction and domestic disparity correction in Nepal (*ILO, 2019*).

The Terai Plain (elevation 60 m to 300 m), which stretches from east to west on the plains of southern Nepal, is a breadbasket that is blessed with fertile soil and water resources and occupies 53% of the total cultivated area and 81% of the total irrigated area. Rice, wheat, vegetables, etc. are produced under rainwater conditions or irrigation, and the share of national production of rice, wheat and vegetables is high, which is 70%, 58% and 59% respectively (*Preparatory Survey on JICA's Cooperation Program for Agriculture and Rural Development, Food Production and Agriculture in Terai, Final Report, 2013*). In addition, since agricultural products in the Terai Plain are also supplied to the northern hills, improving productivity in those areas will greatly contribute to domestic food security.

The Government of Nepal (GON) has been working on the development of irrigation facilities for many years with the support of donors, but There is a problem that irrigation facilities cannot fully function due to insufficient collection of water expenses, improper water use and the operation and maintenance of core facilities so strengthening the capacity of related organizations is an important issue (*15th Five-Year Plan, 2019/20-2023/24*).

For the above reasons, a record of discussions was signed between the Government of Nepal (GON), Ministry of Energy, Water Resources and Irrigation (MoEWRI) and Japan International Cooperation Agency (JICA) for implementing "Technical Cooperation Project for Irrigated Agriculture in Terai Plain" (hereinafter referred to as "the Project") on 09 February 2019.

The overall purpose of the TCP-PIAT is to practice model developed by the project in Terai irrigated area. The purpose of this project is to develop the model for terrain irrigated area by the collaboration between the federal, provincial, local governments and water user associations.

The project consists of the following four components:

- **Output 1**: The issues regarding the Irrigated Agriculture in Kankai Irrigation Scheme 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 operation and maintenance 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 Kankai Irrigation Scheme 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 first phase, which is a method for technical cooperation that an action plan will be first formulated by the relevant stakeholders in a participatory manner at the first phase and then the action plan will be implemented at the second phase of the project, and Outputs 2 to 4 correspond to the activities in the second phase. The activities of the second phase for the Project are to support the local stakeholders in the promotion of irrigated agriculture based on the action plan formulated in the first phase.

The purpose of the baseline survey is to establish baseline values for the project development matrix (PDM) indicators. Specific objectives are to:

- i) Collect data of project indicators at the Kankai Irrigation Scheme on selected PDM indicators
- ii) Assist the project to set achievable and realistic targets for the results

This baseline survey results will establish the benchmark of PDM indicators (Attachment 1.1) for the Work Plan of the TCP-PIAT project (2021-2024) to facilitate keeping track of its progress and changes and devise appropriate interventions.

A baseline survey was conducted by JICA Project Team with Kankai Irrigation Management Office (KIMO), Kankai Canal Water Users Association (WUA) and four municipalities. This survey used participatory approach where KIMO, WUA and four municipalities played active role in providing responses to the questions asked to them as per the structured interview schedule.

This report is organised into seven chapters. The first introductory chapter introduced the project, its components, objectives and methodology of the baseline survey. Chapter 2 briefly introduces KIS for setting the context for the survey. Chapter 3 presents the result of interview survey on KIMO and Chapter 4 shows the interview result of main canal committee (MCC) of WUA. Chapter 5 delves in secondary canal committee (SCC) survey followed by the results of interviews with the individual members in Chapter 6. Lastly but not the least, Chapter 7 summarises key findings and suggestions of the Project activities.

CHAPTER 2 KANKAI IRRIGATION SCHEME

The Kankai Irrigation Scheme (KIS) lies in the eastern Terai (plain) of Nepal, between the latitudes of 26 to 27 degree North and longitude of 87 to 88 degree East. The elevation of the system varies from 120 m in North to 75 m in the South. The KIS command area is surrounded by India in the South, Kankai River in the east, Krishna River in the west, and main canal in the north.

Kankai River is the water source of the scheme and is of perennial type. The catchment area of the Kankai River at headworks site is 1,190 square km. The river originates from Mahabharat Mountain Range flows down through Terai plain and crosses the Indo Nepal Boarder and finally merges into River Ganges in India.

KIS is located in Jhapa district of Province No 1, which is the easternmost of the seven provinces established by the new constitution of Nepal which was adopted on 20 September 2015. KIS spreads in two municipalities (Shivasatakshi and Gauradaha) and two rural municipalities (Gauriganj and Kamal) of eight municipalities and seven rural municipalities in Jhapa district as shown in the following figure. Of these 4 municipalities, almost 85% of command area in KIS falls in Shivasatakshi municipality.



Source: JICA Project Team

Figure 2.1-1 Location of Four Municipalities in Kankai Irrigation Scheme

The scheme area has warm temperate and rainy climates with mild winters as showing in the following figure. The main cropping season is rainy season cultivating paddy from July to November in almost all area in Kankai irrigation scheme. Other two seasons is: spring season for paddy and maize mainly, winter season for vegetable.

Technical Cooperation Project for the Promotion of Irrigated Agriculture in Terai Plain Baseline Survey Report



Source: Department of Hydrology and Metrology

Figure 2.1-2 Meteorological Condition in Kankai Irrigation Scheme

The construction of this scheme was undertaken in two phases through the technical and financial assistance of the Asian Development Bank. Initiated in 1971, the first phase was completed in 1981 bringing 5,000 ha under irrigation. The second phase was started in 1981 to extend irrigation facilities to another 3,000 ha; but the irrigation facilities was extended up to 2,000 ha only by 1991 as shown in Figure 2.1-1. Remaining 1,000 ha has very limited infrastructure development up to hydraulic layer of tertiary canal. It is said the total irrigable are about 7,000 ha but JICA Project Team is now trying to confirm the actual irrigable area using GIS.

KIS has fixed weir type headworks designed across Kankai River. The weir is located around 3 km upstream of East-West Highway. The length and height of weir in place is 126 m and 1.84 m respectively. The under sluice located to the right bank of Kankai River along headworks axis is designed to pass up to 600 m³/s discharge downstream. Main canal off taking upstream of under sluice has idle length of 1,570 m until the location of *Sardare* Escape structure comes along its flow course.

The canal system comprises a three tier networks of canals. The main canal (MC) length is 34 km with 74 km of secondary canals (SC) and 110 km of tertiary canals (TC). The canal taking water from MC and flow into the field is called as direct tertiary outlet (DTO). Kankai Irrigation System has developed MC into five reaches over its two phases of development. The canal network in Reach-I through Reach-IV has been developed in its first phase down up to tertiary canal level. Reach-V in KIS is extension part developed in second phase. Reach-I of the main canal is 11.5 km length and lined with a design capacity of 10.15 m³/s, the other reaches are basically unlined and their capacity decreases from 7.25 to $1.75 \text{ m}^3/\text{s}^1$. The canal network crosses many flashy rivers such as Satakshi River.

KIS is currently operated by Kankai Irrigation Management Office (KIMO) from the Government of Province No.1 and Kankai Canal Water Users Association(WUA) composed by local farmers by themselves. WUA operates their activities based on By-law, which is issued in 1993 and has been amended and passed for the sixth time. The Government of Nepal (GON) has transferred the KIS to the WUA with an agreement in 2009 to achieve more efficient use of irrigation water, enhance farmers' participation, reduction of operation and maintenance costs and ensure more equitable distribution of water through the Irrigation Management Transfer Project implemented by the Government of Nepal with the support of the World Bank between 2008 to 2015.

¹ Performance Evaluation of WUA in Irrigation Management Transfer Program in Kankai Irrigation System, Sitara Consult Pvt Ltd.

The schematic layout of KIS is shown in the following figure.



Note: The number of tertiary canal and direct tertiary outlet is to be confirmed. Source: KIMO



CHAPTER 3 KANKAI IRRIGATION MANAGEMENT OFFICE

3.1 Methodology

A baseline survey of the first phase was conducted by JICA Project Team in May 2019. At the second phase, an additional survey was conducted by JICA Project Team on June 2021 to get the more detailed information of Kankai Irrigation Scheme (KIS) and Kankai Irrigation Management Office (KIMO).

Due to the overseas and domestic movement restriction issued by the Government of Nepal (GON) under COVID-19 situation, the additional baseline survey was conducted with a questionnaire sheet and by online interview in June 2021. The questionnaire sheet was prepared by JICA Project Team. The questionnaire sheet was answered by KIMO and was finalised in an online meeting with JICA Project Team.

3.2 Overall

KIS and KIMO had been functioned under the Department of Irrigation (DOI), Ministry of Energy, Water Resources & Irrigation (MOEWRI) of Nepal government until the formation of the province government according to the Constitution of Nepal promulgated in in 2015. The constitution has established a federal government together with seven provincial governments in seven provinces, and 753 local governments (municipality). Currently, the KIS and KIMO function under the jurisdiction of the Ministry of Physical Infrastructure Development (MOPID) of the Province No.1 government. The headquarters of MOPID is located in Biratnagar, capital of Provincial No.1.

3.3 Role and Responsibility

The major roles and responsibility of KIMO are as follows, while WUA is responsible for secondary canals and below:

- i) Operation and management of headworks and main canal system including head gates of secondary canals in KIS,
- ii) Water distribution from main canal to secondary canals,
- iii) Coordination with Kankai Canal Water Users Association (WUA) for suitable water distribution,

According to KIMO Annual Progress Report (FY 2020/2021), the physical progress during FY 20201/2021 is as follows:

- i) Completion of 1747.4 meters RCC lining work
- ii) Completion of 6,484 metre service road strengthening works
- iii) Completion of 9 hume pipe culvert
- iv) Completion of 6 Inlet and cross drainage structure
- v) Repair of 5 irrigation canal gates
- vi) Completion of canal protection work for 1,090 metre canals
- vii) Regulation of water supply in main canal after timely maintenance of canal
- viii) New tertiary canal construction and extension
- ix) Construction of secondary canal and completion of maintenance work
- x) Completion of organizational development work
- xi) Completion of irrigation management work
- xii) Completion of water measurement and calibration work
- xiii) Completion of crop cut survey

3.3.1 Location and Staffing

KIMO is located where main canal (headrace) of KIS and East-West Highway are crossing (refer to Figure 2.1-3).

There are eleven staffs inclusive of four technical staffs and 24 gate operators in KIMO as shown in the following table:

		8
Position	No of Position	Remarks
Senior Divisional Engineer	1	The chief of KIMO
Civil Engineer	1	Main task is the operation and maintenance of irrigation facility.
Agriculture Engineer	2	
Administration	1	
Accountant	1	
Senior Association Organizer	1	Main task is institutional development of WUA and farmers
Computer Operator	1	Office work (data entry etc.)
Sub-Engineer	2	
Driver	1	
Gate Operator	24	Contract staffs with daily wage
Source: KIMO	•	•

 Table 3.3-1
 Staff List of Kankai Irrigation Management Office (As of December 2021)

3.3.2 Property

The office facilities of KIMO are as follows:

Table 3.3-2	Property List (of Kankai Irrigation	Management Off	tice (As of December 2021)
	1 1			(

Position	No of Position	Remarks
4WD vehicle	2	Pickup vehicle (one new and one 23 years old)
Excavator	1	Used for main canal cleaning (handed over by IWRMP) 0.9 m ³ capacity bucket, JCB JS140
Total Station	1	
Theodolite	1	
Level Machine	1	
Handy GPS	2	
Computer/Laptop	6	
Printer	5	
Multimedia Projector	1	
Photocopier	1	

Source: KIMO

3.3.3 Budget

The following figure shows annual budget of KIMO approved by the federal and provincial government for FY 2020/2021.

SN	Item	Annual Budget	Expenditure				
514	Item	(NPR Thousand)	(NPR Thousand)				
1	Provincial government	87,909.00	52,844.72				
2	Federal government (Terai Madhesh Irrigation Special Programme)	28,210.00	28,204.50				
Total		116,119.00	81,049.22				

Table 3.3-3Annual Budget of KIMO in FY 2020/2021

Source: KIMO Annual Progress Report (FY 2020/2021)

The budget from federal government is the part of "Terai Madhesh Irrigation Special Programme", which provides fund for the irrigation schemes located in Terai plain.

KIMO is scheduled to receive NPR 116 million budget but executed only NPR 81 million. According to the accountant of KIMO, the provincial government could not send fund to KIMO due to deficit of revenue caused COVID-19 (Before COVID-19, the approval budget is always sent to KIMO). KIMO executed all fund received from federal and provincial government.

The following table shows the annual budget from provincial government and its expenditure in FY 2020/2021. It is found that KIMO provides budget the repair and maintenance of SC although the management of SCC is the responsibility of WUA as per IMT agreement.

SN	Itom	Annual Budget	Expenditure
5IN	Itelli	(NPR Thousand)	(NPR Thousand)
1	Activities under Capital expenditure		
1.1	Jeep purchasing (Vehicle)	5,000.00	4,999.99
2	Improvement of Irrigation Facility of KIS		
2.1	Maintenance, rehabilitation and protection work ¹⁾	15,000.00	7,420.00
2.2	Conservation of irrigated area ²⁾	6,000.00	4,896.00
2.3	Maintenance of irrigation gate	2,000.00	0.00
2.4	Emergency repair and maintenance	5,000.00	2,923.00
2.5	Repair and maintenance of main canal	15,000.00	8,173.00
2.6	Repair and maintenance of secondary canal	15,000.00	5,814.00
2.7	Purchasing of hume pipe	1,000.00	959.00
2.8	Canal structure repair/maintenance work ³⁾	8,000.00	3,103.00
2.9	Maintenance of service road and Protection work	3,000.00	1,710.00
2.10	Peoples Participation	0	0
Capital Total 75,000.00 39,			
Recur	rent Total	12,909.00	12,846.73
Gran	d Total	87,909.00	52,844.72

 Table 3.3-4
 Annual Provincial Budget and Expenditure in FY 2020/2021

Note: 1): Budget for Renovation of irrigation facilities 2): Budget for Canal Protection by Gabions and Soil bags

3): Budget for Minor repair of irrigation facilities

Source: KIMO Annual Progress Report (FY 2020/2021)

SN	Item	Annual Budget (NPR Thousand)	Expenditure (NPR Thousand)
1	Prosperous Terai Madhesh Irrigation Special Programme		
1.1	Rehabilitation, Re-construction of damaged structure and protection work	28210.00	28204.50
Capit	al budget Total	28210.00	28204.50
Recu	rrent Budget Total	0	0
Gran	d Total	28210.00	28204.50

 Table 3.3-5
 Annual Federal Budget and Expenditure in FY 2020/2021

Note: 1): Budget for Renovation of irrigation facilities Source: KIMO Annual Progress Report (FY 2020/2021)

3.4 Current Situation of Kankai Irrigation Scheme

3.4.1 Command Area

According to KIMO, the actual irrigated land is about 5,500 ha in rainy seasons against a net irrigable area of 7,000 ha in KIS after the improvement of essential irrigation facilities through Irrigation and Water Resources Management Project (IWRMP: 2008-2018). However, the command area is not updated timely.

3.4.2 Season and Water Availability

The typical seasonal cultivation is as follows:

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Cropping Season	Winter		Spring	(Paddy, M	Iaize)		R	ainy (Pado	ly)			Winter
T • .•												
Period	Winter		Spring (a	alternate y	ear)			Rainy	7		Win	nter

Source: JICA Project Team



The irrigation water is plenty in the rainy season, the command area of KIS in rainy season reaches to the full 7000 ha area but the irrigated area in spring (dry) season varies depending on water availability.

3.4.3 Phase-2 Development

The tertiary canals of SC 17 to SC 21 (Reach V) were planned to be complete by 2018. However, the tertiary canals in SC 17 to SC 21 still have been completed by 90%. The balance 10% has a problem of land donation by farmers for construction of tertiary canals. Field channels are partially constructed by farmers but not all in Kankai Irrigation Scheme. KIMO has a plan to develop the tertiary canal and its command area from SC 17 to SC 21 and are ready to submit the detailed project report for the budget approval. (The rehabilitation Kankai headworks is undergoing as a top priority)

3.4.4 Irrigation Facility

The major issue in operation and maintenance (O&M) of KIS is deterioration of irrigation facilities. KIMO budgets for preventive measures and emergency repairs as per the demand and need. Also, Irrigation facilities of KIS have been improved through IWRMP with national budgets as well.

3.5 Regular Activity

3.5.1 Water Distribution

Since the Department of Hydrology and Metrology measures and records Kankai river discharge through a telemetric device at the upstream of the headworks, KIMO records the intake discharge of Main Canal. KIMO does not measure Kankai river discharge at headworks point.

KIMO adopts the whole scheme irrigation in rainy season and winter season, and an alternate seasonal rotation in spring seasons. Though cropping calendar is not prepared for seasonal cultivation, KIMO and WUA operates the water distribution based on their past experience and farmers demand. Alternate rotation is practiced on the basis of secondary canals (SC), for instance, "SC 0 to SC 12" and "SC 0 and 13 to 21" (However, SC 0 get water every year due to the high permeability of soil condition). In winter season, water is still available but irrigated area is limited to about 40% of total irrigable land due to absence of profitable crops (60% is fallow) so KIMO has supplied irrigation water for whole system. In case the river discharge is limited during winter season, it is allowed KIMO to intake all water to KIS. There is no regulation or rule (e.g., water volume, intake period) to intake water from Kankai River.

KIMO covers the water distribution of headworks and main canal system (the water distribution of secondary and tertiary canals is the responsibility of Kankai Canal Water Users Association). The irrigation water is distributed to secondary and tertiary canals by 24 gate keepers that KIMO employs for headworks, desilting basin, escape, cross regulators and head regulators along Main Canal (MC). There is no written plan/rule/manuals for headworks and gate operation but KIMO has instructed them time to time for the gate operation and monitoring of canal. The gate keepers record their operation daily.

The major roles and responsibilities of gate keepers are:

- i) To operate gate and supply water as per demand from MC and SC canal,
- ii) To record the gauge reading and keep it safe,
- iii) To monitor the water distribution in MC and SC,
- iv) To keep the gates and structures operational.

3.5.2 Maintenance

The maintenance of headworks and main canal is the responsibility of KIMO. The major challenges in O&M is their budgeting of O&M activities such as preventive maintenance.

KIMO has been providing the support to WUA for maintenance expenses in case secondary canal committee /tertiary canal committee /direct tertiary outlet committee cannot afford to prepare the budget by themselves. The actual expenses for the individual structure is not separated from the whole budget and KIMO do not have a system to record the preventive measures and emergency repairs on the irrigation facilities.

3.5.3 Communication with WUA and Municipality

KIMO have not established any institutional mechanism /system to have a meeting with WUA Main committee but they have regular contact and have meeting as per need.

Over the last two years, KIMO approached to four municipalities for the tertiary canal and field channel construction, cleaning and improvement.

3.6 The Collected Documents from KIMO

SN	Name of Material	Published	Published by	Remarks
1	National Water Dlan	1n 2005	DWDI	The latest version
2	Irrigation Master Plan	2003	DWRI	The latest version
2	ICWMP Report	2019	DWRI	The latest version
4	Irrigation Policy	2021	DWRI	The latest version
5	Irrigation Rules	2000	DWRI	The latest version
6	Cooperative Regulation of	2000	Provincial No 1	The latest version
0	Provincial No.1	2019		
7	Federal Cooperative Act	2019	Ministry of Land Management, Cooperative & Poverty Alleviation	The latest version
8	Cooperative Act of Provincial No.1	2019/2020	Provincial No.1	The latest version
9	The Completion Report of Kankai Irrigation Project	1979	Nippon Koei Co., Ltd.	-
10	Project Layout Map	-	KIMO	-
11	Irrigation Management Transfer Agreement	2009	Department of Irrigation /WUA	-
12	Draft Report on Asset Management Plan for Main Irrigation Canal in KIS	2017	KIMO	-
13	Annual Progress Report of KIMO	FY 2018/2019, 2019/2020 2020/2021	KIMO	Inclusive of i) Annual Budget /Expenses, ii) Annual Achievement etc.
14	Weather Data of Kankai Irrigation Scheme	-	Department of Hydrology and Metrology	Inclusive of humidity, rainfall, temperature, wind data from 2001 to2015
15	IWRMP Project Report /Material	2008-2018	IWRMP	Inclusive of the following documents: -Project implementation manual -Boundary map of KIS -WUA performance report -Canal operation plan -Asset management plan -TOT manual for irrigation management transfer -Functional status evaluation report -Parcellary map -Exit plan -Geographical management information system (GMIS) installation guide -Deep Tube Well electro- mechanical design , installation and operation -Impact study
16	Irrigation Management Transfer	2009	IWRMP	-

Table 3.6-1	The Collected	Document from	KIMO

Source: JICA Project Team

CHAPTER 4 MAIN CANAL COMMITTEE

4.1 Methodology

A baseline survey of the first phase was conducted by JICA Project Team in May 2021. At the second phase, an additional survey was conducted by JICA Project Team with the members of main canal committee (MCC) on June 2021 to get the more detailed information and understand the COVID-19 effect.

Due to the overseas and domestic movement restriction issued by the government of Nepal under COVID-19 situation, the additional baseline survey was conducted with a questionnaire sheet and by online in June 2021. The questionnaire sheet was prepared by JICA Project Team and Kankai Irrigation Management Office (KIMO). MCC answered the questionnaire sheet with the support of KIMO. The answer was finalised in an online meeting with MCC member, KIMO and JICA Project Team.

4.2 Introduction of Kankai Canal Water Users Association

As a non-profit making non-government organization the Kankai Canal Water Users Association (WUA) was registered at the District Administration Office, Jhapa on 1 December 1993 (BS 2050/8/16) with registration number 148 under the Society Registration Act, 1973.

4.2.1 Organization Structures

The following figure shows WUA organizational chart.



Figure 4.2-1 Organization Chart of WUA

General Assembly is the highest organ of WUA and main canal committee (MCC) is the apex body of WUA. As subordinate committees under MCC, there are 22 secondary canal committee (SCC), which divide the command area of KIS into 22 parts. Under each SCC, there are tertiary canal committees (TCC) and direct tertiary outlet committee (DTOC). The detail list of TCC and DTOC are as follows:

				201 mary o anor	00111111000
Secondary Canal Committee	No of Tertiary Canal Committee	Number of Direct Tertiary Outlet Committee	Secondary Canal Committee	No of Tertiary Canal Committee	Number of Direct Tertiary Outlet Committee
0	7	0	11	4	1
1	10	1	12	6	1
2	9	2	13	5	6
3	5	4	14	11	1
4	11	5	15	7	2
5	6	0	16	7	4
6	4	1	17	8	0
7	5	0	18	5	0
8	7	0	19	6	0
9	4	7	20	7	0
10	7	1	21	4	0
Total	145	36			

 Table 4.2-1
 List of Tertiary Canal Committee and Direct Tertiary Outlet Committee

Source: MCC/WUA

The member of General Assembly is totally 225. One representative will be elected from each 145 TCCs and 36 DTOCs, and two from each SCC ($2 \times 22 = 44$) and the total makes a general assembly of 225 (refer to Section 5.2.2).

4.2.2 WUA Membership

In Kankai WUA, there are several type of farmers: Land owner, Crop sharing farmer, Lease farmer, private firm.

By-law specifies a rule which farmer has a right to join in WUA. A male or female can be a member among the users of irrigation area with land owner or his/her representative, tenant or his/her representative in case of tenancy, a person as per accordance with contract sanctioned by the land owner. The members must have attended 18 years of age. In the case of underage his guardian can become a member till he reaches 18 years of age and if the mental balance is not right, the guardian can become a member until the mental balance is right.

According to MCC, it has distributed membership to 5970 households (HHs) as of FY2020/2021² but it believes that the number of users could be high since some households have still taken single membership despite the separation of the family members and new households who have settled have not taken WUA membership. This necessitates updating the WUA members/users so that not only water could be distributed to all users equitably but also collect irrigation service fee (ISF) from all those who use water for irrigation.

² According to the MCC, this refers to the number of HHs/members who paid ISF in FY2020/2021.

Likewise, outlet wise farmer list with plot no.(*kitta* no.) and its area (ha) is available at the Land Survey Department but the WUA has not synchronized with it. All TCCs still use old record and work with the list of previous land owners and land area.

4.2.3 Task and Responsibility

Kankai Irrigation Management Office (KIMO) under the Ministry of Physical Infrastructure Development (MoPID) of Province Government 1 is responsible for the operation, maintenance and management of head works and main canal. Likewise, MCC manages below the main canal through secondary canal committees (SCCs), direct tertiary outlets and tertiary canal committees (TCCs).

According to By-law, the WUA has divided the responsibilities for the operation and maintenance of secondary canal and tertiary canals to the Secondary Canal Committee (SCC) and Tertiary Canal Committee (TCC), respectively. DTOC has the responsibility for DTO, but they work under the respective SCC. However, in case of inadequate budget for maintenance of their canal, MCC coordinates with KIMO for additional financial support/fund to SCC and DTOC. Based on the fund availability, MCC managed the repair and maintenance works mobilizing respective SCCs.

4.3 MCC Membership

MCC consists of 15 members with 6 female and 9 male members as provisioned in WUA By-law. These members are elected as follows:

Irrigated area /command area has been divided into 5 blocks based on irrigation reach,

- Two members (1 male and 1 female) are selected from each block- Total 10,
- 4 office bearers are elected by the user assembly- President, Vice President, Secretary and Treasurer and former president is also the member.

The WUA elects the members of MCC after the completion of four full years democratically through a general assembly comprising 225 members.

4.4 Income and Expenditure

JICA Project Team have studied the income and expenditure from audit report of MCC for the last three years (The audit report of FY 2020/2021 is not issued yet). According to Table 4.4-1, WUA has gained profit amounted NPR 325,963.89 only in FY 2018/19 and in both FY 2017/18 and 2019/20 losses by NPR 677,428.29 and NPR 1,838,812.00 respectively.

		Fiscal year	
	2017/2018	2018/2019	2019/2020
Income	14,437,175.46	15,699,569.55	18,724,803.84
Expenditure	15,114,603.75	15,373,605.66	20,563,615.84
Loss/Profit	-677,428.29	325,963.89	-1,838,812.00

Table 4.4-1Loss and Profit Statement of WUA for 3 years

Source: MCC/WUA (Independent Audit Report)

As shown in Table 4.4-2 and Table 4.4-3 below, the income of WUA is increasing every year and so is the expenditure. The audit report reveals that canal maintenance budget from KIMO is higher than collection of ISF. During FY 2017/18, the collection of ISF was NPR 1,709,409.00 and the canal maintenance budget from KIMO is NPR 7,046,576.00, whereas in FY 2018/2019 ISF collection is NPR 1,414,681.75 and canal maintenance cost is almost ten times higher than is ISF collection.
Other large income source of MCC is rental from machinery. During FY 2017/18, the gross income of MCC from rental of machinery (excavator, backhoe and tractor) was NPR 3,082,350.00, followed by NPR 3,376,290.00 in FY 2018/19 and NPR 2,643,630.00 in FY 2019/2020. Excavator, backhoe and tractor are the main machinery operated by MCC which are used by users and individuals on rent for various works. Thresher and reaper are the other machinery which earns money but earning is not significant.

From the table below, we can conclude that main three sources of income of MCC are canal maintenance budget from KIMO, income from machinery rental and ISF collection.

CNI	Item	Fiscal Year			
210	Item	2017/2018	2018/2019	2019/2020	
1	ISF	1,709,409.00	1,751,216.00	1,414,681.75	
2	Membership renewal	55,642.00	49,969.00	58,091.00	
3	Entry fee	8,000.00	4,000.00	4,000.00	
4	Canal maintenance (O&M fee)	110,372.00	14,495.00	6,195.00	
5	Excavator operation	990,750.00	1,210,860.00	775,400.00	
6	Backhoe operation	1,780,100.00	2,010,480.00	1,712,510.00	
7	Tractor operation	311,500.00	154,950.00	155,720.00	
8	Thresher	56,500.00	40,100.00	33,500.00	
9	Reaper	15,000.00	15,100.00	0.00	
10	Canal maintenance budget from KIMO ¹⁾	7,046,576.00	8,268,967.65	14,404,885.29	
11	Machinery operators remuneration budget				
	from KIMO ²⁾	130,160.00	30,000.00	0.00	
12	Grant (Others)	79,488.00	0.00	65,700.00	
13	Miscellaneous income	8,915.63	29,361.90	4,500.00	
14	Cash crop programme ³⁾	2,046,222.00	2,031,070.00	0.00	
15	Rent of meeting hall	88,500.00	89,000.00	71,000.00	
16	Interest	40.83	0.00	18,620.80	
	Total	14,437,175.46	15,699,569.55	18,724,803.84	

 Table 4.4-2
 List of Income of MCC for Last 3 Fiscal Years

Note: 1) This budget is provided by KIMO for secondary canal and tertiary canal.

2) KIMO was used to provide the budget for machinery operators remuneration but it is not stopped in FY 2020/2021.
3) To promote spring rice (Chaite dhan) AKC has provided fund to MCC, and MCC distributed cash to farmers on the basis of crops grown.

grown. Source: MCC/WUA (Independent Audit Report)

SN	Item	Fiscal year			
SIN		2017/2018	2018/2019	2019/2020	
1	Remuneration of staff	653,840.00	756,640.00	1,019,982.00	
2	ISF Collectors Remuneration	238,768.00	242,724.00	199,553.75	
3	Meeting allowance for MCC	58,400.00	58,800.00	66,800.00	
4	Operator's Remuneration	175,987.00	221,812.00	0.00	
5	Allowance for Mechanical Equipment Operation				
	Sub-committee	74,800.00	88,650.00	47,812.00	
6	Travel allowance	19,500.00	25,700.00	21,000.00	
7	Office stationery	41,608.00	53,520.00	25,980.00	
8	Printing	97,220.00	89,260.00	112,400.00	
9	Newspaper	5,350.00	4,000.00	0.00	
10	Sanitation	8,900.00	12,000.00	12,000.00	
11	Repair and Maintenance office	12,890.00	22,650.00	19,800.00	
12	Water and Electricity	12,905.00	15,470.00	8,318.18	
13	Communication	51,645.00	64,564.00	47,985.00	
14	Fuel (Motor cycle)	27,715.00	36,609.00	35,095.65	
15	Fuel (Tractor)	70,922.00	39,395.00	34,634.11	

SN	Itom	Fiscal year			
SIN	Itelli	2017/2018	2018/2019	2019/2020	
16	Fuel (Excavator and Backhoe)	1,027,091.00	1,292,367.00	1,182,243.47	
17	Repair and Maintenance (Motor cycle)	63,463.00	47,950.00	34,550.00	
18	Repair and Maintenance (Tractor)	86,846.00	115,148.00	30,060.00	
19	Repair and Maintenance (Excavator and Backhoe)	478,438.00	539,458.00	619,844.75	
20	Hospitality	69,695.00	94,560.00	70,835.00	
21	Auditor remuneration	16,000.00	19,000.00	27,000.00	
22	General Assembly expenses	116,245.00	100,150.00	0.00	
23	SCC and TCC expenses(ISF distribution)	784,501.00	806,518.00	656,346.15	
24	Government Revenue	170,987.00	175,123.00	189,793.00	
25	Canal maintenance for SC and TC ¹⁾	7,156,948.00	9,183,462.00	14,410,780.00	
26	Reward and Honour expenses	9,200.00	8,250.00	8,500.00	
27	Transportation	15,734.00	4,858.00	7,453.00	
28	Cash crop programme	1,947,722.00	0.00	0.00	
29	Tractor operation	117,830.00	0.00	0.00	
30	Miscellaneous	129,287.98	11,235.47	16,685.00	
31	Depreciation	1,374,165.77	1,243,732.19	1,658,164.78	
	Total	15,114,603.75	15,373,605.66	20,563,615.84	

1) This budget is provided by KIMO described in Table 4.4-2 as "Canal maintenance budget from KIMO" Note: MCC/WUA (Independent Audit Report) Source:

The profitability of machinery operation of MCC has been calculated as shown in the following table. WUA has been earning some profit excluding the expenses of machinery operation like the cost of fuel, repair and maintenance and operator's remuneration. The profit from machinery rental were NPR 1,243,066.00 in FY 2017/2018 and NPR 1,168,110.00 in FY 2018/2019 and NPR 776,847.67 in FY 2019/2020.

 Table 4.4-4
 Profitability Table from Rental Machinery of WUA for Last Three Years

	Fiscal Year			
	2017/2018	2018/2019	2019/2020	
Machinery Income Total	3,082,350.00	3,376,290.00	2,643,630.00	
Excavator operation	(990,750.00)	(1,210,860.00)	(775,400.00)	
Backhoe operation	(1,780,100.00)	(2,010,480.00)	(1,712,510.00)	
Tractor operation	(311,500.00)	(154,950.00)	(155,720.00)	
Machinery Expenses	1,839,284.00	2,208,180.00	1,866,782.33	
Operators' remuneration	(175,987.00)	(221,812.00)	(0) ¹⁾	
Fuel expenses	(1,098,013.00)	(1,331,762.00)	(1,216,877.58)	
Repair and Maintenance	(565,284.00)	(654,606.00)	(649,904.75)	
Loss/Profit	1,243,066.00	1,168,110.00	776,847.67	

Note: Operators' remuneration is adjusted to "Staff Remuneration" described in Table 4.4-3. Source: MCC/WUA (Independent Audit Report)

Table 4.4-5 Duuget and Expense for Canal Maintenance for Last Three Tear	Table 4.4-5	Budget and Ex	pense for Canal	Maintenance for	Last Three Years
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	Fiscal Year			
	2017/2018	2018/2019	2019/2020	
Budget Total	7,156,948.00	8,283,462.65	14,411,080.29	
Canal maintenance (O&M fee)	(110,372.00)	(14,495.00)	(6,195.00)	
Canal maintenance budget from				
KIMO	(7,046,576.00)	(8,268,967.65)	(14,404,885.29)	
Expenses Total	7,156,948.00	9,183,462.00	14,410,780.00	
Canal maintenance for SC and				
$TC^{1)}$	(7,156,948.00)	(9,183,462.00)	(14,410,780.00)	
Source: MCC/WIIA (Independent Audit Report)				

Source: MCC/WUA (Independent Audit Report)

4.5 Property

The property of MCC are as follows:

- v) Land: $0.19 \text{ ha} (5.5 \text{ kattha}^3)$
- vi) Building (MCC office): one
- vii) Back hoe: one
- viii) Excavator: one
- ix) Tractor: one
- x) Maize Seed Spreader: one
- xi) Thresher: one (out of control)

MCC office is located in ward 5, Janata, Shivasatakshi municipality with several facilities (working space, meeting hall, storage room of heavy equipment)



Source: JICA Project Team

Figure 4.5-1 Office of Main Canal Committee

The detailed information of heavy equipment and agricultural machinery are as follows:

No.	Item	Model	Q'ty	Period of Use
1	Excavator (Crawler Type)	JCB JS 80	1 no.	12 years
		Bucket Capacity: $0.24 - 0.32 \text{ m}^3$		
2	Backhoe Loader (Wheel Type)	Case 851 Ex	1 no.	6 years
3	Tractor	Sonalika DI-60	1 no.	10 years
4	Thresher	Madho	1 no.	8 years
5	Maize Seed Spreader (Out of	National Ludhiana	1 no.	6 years
	Control)			

Table 4.5-1	List of Heavy	Equip	nent and A	gricultural	Machinerv
				-	

Source: MCC/WUA

³ Kattha is Nepalese customary unit of measurement of land. 1 kattha is equal to 0.034 ha.



Source: JICA Project Team

Figure 4.5-2 Photographs of Heavy Equipment and Agricultural Machinery

The above equipment is procured by World Bank under Irrigation and Water Resources Management Project (IWRMP: 2008 to 2018) and handed over to KIMO and WUA.

The responsibility of heavy equipment (excavator, backhoe, tractor) is as shown in the following table:

	D	•••	0 TT	T • •	3.6
Table 4.5-2	Responsible	Organization	for Heavy	Equipment	Management

Responsibility	Responsible
	Organization
Ownership of Equipment	KIMO
Government Registration to Department of Transportation	KIMO
Operation and Maintenance	Kankai WUA
Source: MCC/WIA	

4.6 Main Activities

Main activities undertaken by MCC are as follows:

S.N.	Activity	Description	Remarks
1	Coordination in water allocation from main canal to secondary canal	MCC collects the demand of each SCCs and support KIMO for the timely distribution.	Water distribution to secondary canal is the responsibility of KIMO.
2	Coordination in maintenance of irrigation facilities under main canal	Repair and maintenance of irrigation canal is carried out before rainy season. MCC work for the coordination with KIMO in maintenance schedule, intake restriction.	Repair and maintenance of main canal is the responsibility of KIMO
3	Support SCC /TCC /DTOC in maintenance of irrigation facilities under secondary canal, tertiary canal, direct tertiary outlet	Basically, MCC doesn't provide additional budget to TCCs, SCCs and DTOCs. However, MCC coordinate with TCCs, SCCs and DTOCs to requests KIMO for financial support based on needs, urgency.	Repair and maintenance of each secondary canal, tertiary canal, direct tertiary outlet is the responsibility of SCC /TCC /DTOC.
4	Collection of Irrigation Service Fee(ISF)	Each member has to pay for the strengthening, repair, maintenance, security and operation of the irrigation scheme.	Irrigation service fee and other fees determined by the general assembly

 Table 4.6-1
 Summary of MCC Activities

S.N.	Activity	Description	Remarks
5	Distribution of ISF to its subordinate committees and payment of government revenue	The distribution rate of ISF is specified according to WUA By-law.	
6	Collection of other service fee	-Entry Fee -Membership Renewal Fee -Recommendation Fee -Rental fee of MCC Meeting Hall -Rental fee of machinery equipment	
7	Rental of heavy equipment and agricultural machinery	The rental fee is the major sources of fund in MCC. MCC lends their equipment to all individual famer, farmer's group and TCC/TCC/DTOC in Kankai Irrigation Scheme.	
8	Documentation	MCC keeps various documents related to WUA activities and the submission report from SCC, TCC and DTOC.	
9	Monitoring, direction/guidance and audit the work of SCC/DTOC/TCC	MCC performs regular monitoring, direction/guidance and audit of works which is accomplished by SCC/DTOC/TCC.	
10	Income generating programs for low-income groups	It is stated in By-law but MCC has never launched any such program	

Source: JICA Project Team prepared based on the interview with MCC/WUA

4.7 Meeting

There are four types of meeting conducted by MCC as shown in the following table:

SN	Type of Meeting	Frequency	Remarks/Comments
1	General assembly	Held once a year Average No. of participants: 170 to 190	Highest body of WUA -approve, revise and related rules WUA rules and regulations -approve and audit budget and related reports -approve any kind of service fee to be collected from the WUA based on the Irrigation Rule and By-laws.
2	MCC Meeting	12 times/year	In FY 2020/21, the meeting was conducted 12 times.
3	Meetings between MCC and SCC	Not scheduled, held as per necessity (Generally once a month)	-
4	Meetings between MCC and KIMO	Not scheduled, held as per necessity	Contributed good understanding with each other

Source: MCC/WUA

MCC meeting is held normally once in a month (12 times a year). The agendas are focused on water distribution, canal maintenance, ISF collection, machine and equipment operation, agriculture activities and dispute resolution etc.

4.8 ISF Collection and Distribution

Major sources of fund for WUA are collection of Irrigation Service Fee (ISF) from water users, income of providing equipment, meeting hall and rooms as a rental services and also collection of entry fee and recommendation fee as a service charges.

The current ISF rate is NPR 450.00 /ha /season. Earlier, the rate was NPR 300.00 /ha/ season which remained effective till FY 2016/17. ISF is collected on annual basis in spring season- from January/February to May/June. Land owner who is scheduled to get irrigation water during spring season needs to pay ISF amount just double than those who will not get water during spring season. It means two types of ISF are collected (double amount means NPR 900.00 /ha from spring season water users and normal amount NPR 450.00 /ha from other general farmers who use water from KIS). There is no matter what types crops are grown by farmers in the field, means there is no any formal relationship between collection of ISF and crop plantation in farmers' field. Even if the land is remained in fallow in both of rainy season and alternative rotation spring season, WUA member have to pay ISF.

The responsibility of ISF payment goes to the land owners. If there is an agreement between the land owner and the land users (share-croppers, lessors), the obligation to pay the fee goes to the land users.

The ISF collection of last three years is shown in the following table (the detailed information is described in Section 5.3.3):

SN	ISF Collection	Remarks
FY2017/2018	NPR 1,709,409.00	
FY2018/2019	NPR 1,751,216.00	-
FY2019/2020	NPR 1,414,681.75	ISF collection in FY 2019/2020 is decreased due to COVID-19 situation.
FY2020/2021	NPR 1,617,183.00	

Table 4.8-1ISF Collection Amount in KIS

Source: MCC/WUA

The following figure shows ISF collection and distribution flow in Kankai WUA. According to By-law the collected ISF is distributed as follows:1. Payment of government revenue 10%, 2. Remuneration for ISF collector 15%. The remaining fund is counted 100% and divided into 40 % for DTOC/TCC, 20% for SCC, 40% for MCC.



Source: JICA Project Team prepared based on By-law of WUA



ISF is collected through collectors who are appointed by DTO/TC committee. Usually, collectors are from committee members like chairperson, secretary, treasurer. According to By-law of WUA, the collected ISF from water users will send to secondary canal committee (SCC) and SCC forwards ISF to MCC. Sometimes collectors send ISF to MCC directly also. The distribution of ISF has been done immediately when MCC receives the ISF. MCC office manager manages ISF calculation, verification and recording (For the further information, refer to Section 5.3.3).

4.9 Collection of Other Service Fee

There are several fee that MCC collect from WUA members and other organization.

The following figure shows the several type of service fee which MCC collects from WUA members, other organization and personnel.

SN	Type of Service Fee	Description
1	-Membership Fee -Renewal Fee	Membership fee for new member is charged NPR 50.00 and renewal fee is charged NPR 10.00 /year /user. These fees are collected during the ISF collection but this fee is not distributable. It will be remained in MCC as their budget.
2	-Entry Fee	Many individuals, groups, organizations they come to KIS area for study and observation of irrigation system and every groups are charged NPR 2,000.00 by WUA as entry fee.
3	-Recommendation Fee	WUA charges recommendation fee NPR 200.00 from concerned individual or organization when such as banks, cooperatives and other financial institutions ask WUA to clarify the actual land status with respect to canal for mortgage purpose.
4	-Rental fee of MCC Meeting Hall	MCC has a meeting hall inside the MCC office and rents to farmers for seminar, meeting, event etc.
5	-Rental fee of machinery equipment	Refer to Section 4.10.

 Table 4.9-1
 Type of Service Fee Collected by MCC

Source: MCC/WUA and By-law

MCC does not collect O&M fee for regular maintenance and large scale reconstruction. As per the decision of General Assembly, DTOC/TCC/SCC can collect O&M fee and invest on cleaning of canal and maintenance.

4.10 Rental of Heavy Equipment and Agricultural Machinery

MCC formed the rental system of heavy equipment and agricultural machinery for all individual famer, farmer's group and SCC/TCC/DTOC within Kankai Irrigation Scheme. The rental procedure has been made by MCC as Mechanical Equipment Operation Regulation 2073 and approved in General Assembly.

The rental operation and maintenance of heavy equipment and agricultural machinery is managed by mechanical sub-committee under MCC. The sub-committee is chaired by Vice chairman of WUA and two SCC chairmen are member (total three members). It is mandatory for the sub-committee to conduct a meeting once in a month to check the operation record and the amount of income and expenditure and make necessary decision. In FY2020/2021, the meeting was conducted 6 times due to the effect of COVID-19. Every work done by the sub-committee during the operation of the equipment shall be presented to the main committee every month (Annual internal and external audit are also carried out).

There are three operators and one helper on monthly contract basis in the sub-committee but no fulltime maintenance technician for heavy equipment and agricultural machinery. Whenever technicians is required, MCC call them from local workshop.

According to the above mentioned regulation, the equipment in the organization should be operated and used with priority for facilities maintenance and institutional purposes. Apart from that, it can be operated and used for personal uses of other individuals, associations and institutions within the Kankai Irrigation Scheme as per the need. Any individuals or organization have to submit an application with who wants equipment on rent with deposit amount in advance.

The heavy equipment and agricultural machinery are provided with hourly fee or seasonal fee as follows:

SN	Applicant	Rate	Remarks
1	-SCC/TCC/DTOC	Back-hoe loader: NPR 1,500 /hour Excavator: NPR 1,800 /hour	-Inclusive of operator fee and maintenance cost.
2	-Individual famer -Farmer's group	Back-hoe loader: NPR 1,800 /hour Excavator: NPR 2,500 /hour Tractor: NPR 2,000 /day or NPR50,000/ month Thresher: NPR 15,000 /season	-User shall pay fuel cost and transportation charge for excavator (NPR 7,000 per one way) in addition to hiring charge.

Table 4.10-1 Rental Fee of Heavy Equipment and Agricultural Machinery

Source: MCC/WUA

There are two types of rates for the operation of heavy equipment and agricultural machinery in the organization to be charged. For system maintenance and institutional purposes, MCC charges at a lower rates while other individuals, associations and organizations is set different rates.

The total annual income of rental equipment is as follows:

-1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1					
Nome of Mashingmy	Fiscal Year				
Name of Machinery	2017/18	2018/19	2019/20		
Excavator	990,750	1,210,860	775,400		
Backhoe Loader	1,780,310	2,010,480	1,712,508		
Tractor	311,500	154,950	155,720		
Thresher	56,500	40,100	33,500		
Reaper	15,000	15,100	0		
Total Amount	3,154,060	3,431,490	2,677,128		
Source: MCC/WILL					

Table 4.10-2 Annual Gross Income by Heavy Equipment Rental

Source: MCC/WUA

4.11 Documentation

WUA/MCC keeps various types of documents such as administrative, financial, machinery, equipment operations, ISF collection, canal maintenance, water distribution, agriculture production, dispute resolutions and also manages documents of elections and formation of committees. In addition, documents related with rules and regulations approved by general assembly as well as documents regarding the repair and maintenance of canal are also available in WUA/MCC.

MCC submits Income and Expenditure Report and Audit Report as financial documents including ISF collection, machinery operation and canal repair and maintenance, and Annual Program as a budget plan along with their decisions to Kankai Irrigation Management Office (KIMO) for review and actions as shown in the following figure.



Source: MCC/WUA and By-law

Figure 4.11-1 Flow Chart of Document Submission Prepared by WUA

4.12 Others

According to MCC, land levelling and plot shaping is done by farmers themselves. There is a few cases that farmers do their on-farm development work. Users from TCC 1, 4 and 6 of SC 1 and TE 4, 5 and 6 they have constructed Field channel 2-4 in numbers. MCC is trying to make understand the importance of field channel to farmers. In some farmer's field channel has been constructed from support of MCC/WUA.

4.13 The Collected Documents from MCC

SN	Name of Material	Published in	Published by	Remarks
1	By-law	2020	WUA	Sixth amendment
2	Audit report of WUA	FY 2018/2019, 2019/2020 2020/2021	WUA	-
3	ISF Collection Record	FY 2018/2019, 2019/2020 2020/2021	WUA	-
4	Mechanical Operation Regulation	2016	WUA	-
5	Rental Rate for Machinery Equipment and other items	-	WUA	-
6	Application for Machinery Equipment Rental	-	WUA	-
7	Record of Machinery Equipment Record	FY 2018/2019, 2019/2020 2020/2021	WUA	Inclusive of the records for excavator, backhoe, tractor

Table 4.13-1	The Collected Document from MCC	
1 abic 7.13-1		

Source: MCC/WUA

CHAPTER 5 SECONDARY CANAL COMMITTEE

5.1 Introduction and Survey Method

With the objective of setting up a baseline data, JICA Project Team developed a questionnaire sheet for the survey with secondary canal committee (SCC) of Kankai Canal Water Users Association (WUA). Due to pandemic situation of COVID-19, a face-to-face interview was avoided and a virtual interview through Facebook messenger was followed for the four model SCCs (SCC 01, 10, 15 and 17). After confirming the availability of internet, the first test interview was conducted with SCC 10 on 24 July 2021 through messenger. After the feedback of test interview, JICA Project Team revised some necessary sections of the sheet as a final questionnaire to conduct an interview with other model SCCs.

Several attempts were made to get expected answers from respondents and therefore phone call was also entertained when a virtual interview was not enough. However, JICA Project Team performed the survey task of all model SCC on 2nd week of August.

After some relaxation from COVID-19, JICA Project Team arrived the Project office on 3rd week of August 2021. JICA Project Team started face to face interview with other SCCs on 5 September 2021 with SCC 0. JICA Project Team completed all interviews for baseline survey on 2nd week of September 2021 (Attachment 5.1). It is noted that COVID-19 protocol were strictly followed during live interview survey.

JICA Project Team tried to contact with chairpersons of SCCs for authorized responses. However, due to unavailability, JICA Project Team interviewed with secretaries of SCC 02, 07, 14 and 20. For other SCCs, the remaining respondents were a chairperson. Some chairpersons had jointly responded with secretary of the respective SCCs (SCC 0, 01, 04, 10 and 17).



Source: JICA Project Team

Figure 5.1-1 Interview with Respondents on Baseline Survey of SCC

5.2 General Information

5.2.1 Basic information of SCC, TCC and DTOC

The Water User's Association (WUA) of Kankai Irrigation Scheme (KIS) was formed and registered on 1st December 1993 under the Water Resources Act (1993). WUA has three tiered organizations, which are structured as follows: i) direct tertiary outlet committee and tertiary canal committee (DTOC/TCC) at the direct tertiary outlet (DTO) /tertiary canal (TC) level, ii) secondary canal committee (SCC) at the secondary canal level and iii) main canal committee (MCC) to work at the whole system level. The tenure of SCC /TCC /DTOC is four years.

Every SCC has corresponding TCC and DTOC as per WUA structure. This unit of the DTOC/TCC is the basic grass roots level organization in some cases managing more than one DTO and TC (The number of TCC and DTOC is shown in Table 4.2-1).

All DTOCs, TCCs and SCCs are responsible for overall management of canal DTO, TC and SC respectively and the distribution of water to farmer's field. Other important responsibility is to collect Irrigation Service Fee (ISF) from WUA members. The WUA By-law provides details roles and responsibilities of each of the committees.

JICA Project Team characterized the active and inactive DTOC/TCC within the SCC during the baseline survey as shown in the table below. The basis of judgement on active/inactive users committee/members are collecting ISF, conducting meetings, participation in meeting and participation on activities organized by WUA.

Name of SCC	Active Number of DTOC/TCC	Inactive Number of DTOC/TCC
SCC 0,1,3,4,910,11,13,15,16,17,18,	117(All)	0
19 and 20	117(All)	0
SCC 2,5,20 and 21	0	28(All)
SCC 6	1	4
SCC 7	3	2
SCC 8	6	1
SCC 12	6	1
SCC 14	5	7
Total	138	43

 Table 5.2-1
 Number of Active and Inactive DTOC/TCC in Each SCC

Source: JICA Project Team

5.2.2 Formation of SCC, TCC and DTOC

This section explain how SCC, TCC and DTOC are formed based on By-law.

According to By-law of WUA, a farmer's assembly has a responsibility to form DTOC/TCC. All water users shall be the member of a farmer's assembly under DTOC /TCC, where they pays membership fee.

In each DTOC /TCC, assembly members for secondary assembly and a member for general assembly are selected respectively. The secondary assembly is the secondary canal wise organization which the representative from each DTOC /TCC shall join in. There are altogether 22 secondary assemblies with each SCC.

The formation system of TCC, DTOC and SCC from a farmer's assembly is shown in the following figure.



Source: JICA Project Team prepared based on the interview with MCC/WUA

Figure 5.2-1 Farmers Assembly and Formation of TCC

From the farmer's assembly, seven members, including one chairman, one vice-chairman, one secretary, one treasurer (woman) and three members shall be elected for DTOC/TCC. Three members shall be elected for secondary assembly and one member shall be selected for general assembly.

Similarly, from secondary assembly, nine member shall be elected for SCC and two members shall be elected for general assembly (one members must be a woman) as shown in the following figure.



Source: JICA Project Team prepared based on the interview with MCC/WUA

Figure 5.2-2 Secondary Assembly and Formation of SCC

Each SCC comprises a secondary canal committee of 9 executive members as shown in the following figure. Each committee has one chairman, one vice-chairman, one secretary, one treasurer (woman) and five members.

The By-law of Kankai Canal Water Users Association (WUA) has ensured the participation of women at least 33% in executive number of SCC. The following table shows the detail list of executive members of each SCC and the number of women participation in executive committee. According to table below, the number of participation of women in executive committee is 63, which is around 33.33%.

N. GOOG	Total Executive	No. of Active	Number of	Member
Name of SCC	Member	Member	Male	Female
0	9	9	7	2
1	9	7	7	2
2	9	9	7	2
3	9	9	7	2
4	9	9	7	2
5	9	9	6	3
6	9	9	6	3
7	9	7	6	3
8	9	9	6	3
9	9	9	6	3
10	9	7	6	3
11	9	9	6	3
12	9	9	6	3
13	9	9	6	3
14	9	9	6	<u>3</u>
15	9	6	6	3
16	9	9	6	3
17	9	9	6	3
18	9	9	6	3
19	9	9	6	3
20	9	4	5	4
21	9	0	5	4
Total	189	175	135	63

 Table 5.2-2
 Number of Executive Member in Each SCC

Source: JICA Project Team

5.2.3 Water Users and Command Area

Presently it is said the KIS command area approximately 7,000 ha of four municipalities in Jhapa district. Regarding secondary canal wise command area, JICA Project Team could not get authentic data from SCC. Likewise, SCC does not keep authentic data on current water users of WUA.

The command area under KIS covers the area of ward No. 2, 3, 4, 5, 6, 7, 9 and 10 of Shivasatakshi municipality, ward No. 9 of Gauradaha municipality, ward no. 1 of Gauriganj municipality and ward no 1 of Kamal municipality.

SCC	Location (Municipality and Ward number)	SCC	Location (Municipality and Ward number)			
0	Shivasatakshi-10	11	Gauriganj-1			
1	Shivasatakshi-9 and7	12	Gauriganj-1			
2	Shivasatakshi-6 and 7	13	Shivasatakshi-2 and 3			
3	Shivasatakshi-6 and 5	14	Shivasatakshi-4 and Kamal-1			
4	Shivasatakshi-4,5 and 6	15	Kamal-1 and Gauradaha-9			
5	Shivasatakshi-4 and 5	16	Kamal-1 and Gauradaha-9			
6	Shivasatakshi-4 and Gauriganj-1	17	Gauradaha-9			
7	Shivasatakshi-4 and Gauriganj-1	18	Gauradaha-9			
8	Gauriganj-1	19	Gauradaha-9			
9	Shivasatakshi-4 and Gauriganj-1	20	Gauradaha-9			
10	Shivasatakshi-4 and Gauriganj-1	21	Gauradaha-9			
Source: JICA Project Team						

 Table 5.2-3
 Location of SCs in Four Municipalities.

5.2.4 Field Channel, Stop Log and Division Box

The construction of canal in KIS is limited to tertiary level. There is still undeveloped canal to deliver water from tertial canal to farmer's field, which is called as a field channel. Farmers usually practice flood irrigation due to no provision of field channel in KIS. The field surrounded other fields can get irrigated only after the water overflows from upper field. The water wastage is high and the water arrival depends on the upper field.

The following picture shows field channel in SC-10 have constructed by users themselves. The respondent (chairperson of SCC 10) answered that they have using the field channel from the very beginning to irrigate the individual farmer's field.



Source: JICA Project Team

Figure 5.2-3 Field Channel Constructed by Water Users in SC 10

Other irrigation facilities at the bottom level of water distribution are stop log and division box. Division boxes are used to divide or direct the flow of water from field channel to field channel. During the survey JICA Project Team found that only SC 01 constructed one division box in TC-06. There are not division boxes in other SCs. However, all TCs has an outlet to distribute water to the field.

Stoplogs are used to cut off or stop flow water in a canal. Typically, stoplogs are made of timber are used in floodgates to adjust the water level or discharge in a canal. It is placed into premade slots inside gate, channel or outlets. During the survey it was found that there were not such facilities to control irrigation water. Rather, users are used to utilise soil, grasses, stone and banana leaves to divert and control water instead of stoplogs. However, check gates are functional in many canal along SC to TC. They are of permanent structure made from steel.

The following pictures shows the current situation of field outlets and stoplog in KIS.



Slots are constructed along TC but there is no permanent structure for stoplog. Source: JICA Project Team

Figure 5.2-4 Tertiary Canal and Field Outlets (SC 20)

5.2.5 Shallow Tube Well

The shallow tube well is the alternate source of irrigation water by which underground water is brought to soil surface with the use of suction lift pumps. Usually, tube or shaft is vertically set into the ground at a depth that is usually less than 15-meter assuring aquifer level of ground water.

During the survey, it was found that in most of the area of KIS, the users have installed shallow tube well in their field even there are the provision of irrigation canal. Shallow tube well is easy to use when water supply is insufficient in canal. The grant is available on installing shallow tube well from many agencies (e.g., KIMO, municipality, NGO and international agency). The Government of Nepal sets partly an exemption on tariff of electricity for who use electricity for irrigation purpose.

However, in the area of SC 0, there are not a single shallow tube well installed by farmers since the permeability of the soil is high resulting not feasible to install shallow tube well. Likewise, SC 01, 07 and 13have very few numbers of installation of tube well as compare to other SC areas.

5.3 Accounting

5.3.1 Account Information

Most of the SCCs have opened their account in bank and cooperative. Out of 22 SCCs, 15 SCCs have account and seven SCCs have not any account. Among 15 SCCs, six SCCs have opened their account in bank and the rest of the SCCs have opened their account in cooperative.

Table 5.5-1 Dank Account maintained by SCC						
Account in Bank	Account in Cooperative	No bank account				
SCC 0,2,3,4,5 and 14	SCC 1,6,7,8,10,13,11,15 and 17	SC 9,12,16,18,19,20 and 21				
Source: JICA Project Team						

 Table 5.3-1
 Bank Account maintained by SCC

The number of signatories for cheque operation is three in all SCCs except SCC 0 and 11. Usually, chairman, secretary and treasurer use their signature for cheque operation, but SCC 0 and 11 sign on cheque only by chairman and secretary.

5.3.2 Income and Expenditure

Except for SCC 0, 01,07,10,15 and 17, other SCCs have not maintained account keeping as per By-law in their office. Other SCCs usually keep their details of income and expenditure in their minute book

and get approved by the committee members and internal auditor. They have limited transaction so they do not feel a necessity to maintain account books in prescribed format.

5.3.3 ISF and Number of Payers

The rule decided in WUA sets that every water user should pay NPR 900.00 per ha/year who is schedule to receive water in two season a year. JICA Project Team asked every respondent (SCCs) to show the details of number of ISF payers and collected amount, but they expressed inability to do so. In practice, either collector or sometimes responsible members of SCC collects ISF and submits the collected amount with receipts to MCC. The office manager makes a summary sheet and a detail list of users and collected amount on the basis of receipt. After that, the office manager divides the ISF as per By-law and sends to the corresponding parties (SCC, TCC, MCC, Collector and the government revenue) with the summary sheet (the office manager send the detail list as per the request from SCC). That's why no respondents (chairman and secretary of SCC) could show the list of ISF payers and collected amount. They all referred to contact with the office manager of MCC for the details of ISF payers and amount.

JICA Project Team collected the detailed information of ISF payment from MCC as shown in the following table.

EV 2019/10		EV 2010/20	EV 2020/21				
800	ГТ 2010/19	Г 1 2019/20	N.		1 2020/21		
SCC	ISF Collection (NPR)	ISF Collection (NPR)	NC T 1	of ISF Pay	ers	ISF Collection	
	· · ·		Total	Female	Male	(NPR)	
0	132,520.00	67,216.00	393	193	200	138,400.00	
1	316,605.00	151,519.00	474	176	298	282,720.00	
2	104,146.00	69,898.00	492	186	306	160,779.00	
3	99,040.00	89,998.25	510	213	297	95,924.00	
4	145,746.00	132,427.50	552	217	335	148,447.00	
5	29,185.00	74,555.00	250	88	162	43,575.00	
6	32,345.00	24,553.00	200	62	138	30,181.00	
7	29,769.00	15,507.00	81	28	53	14,930.00	
8	38,557.00	37,965.00	202	62	140	43,105.00	
9	89,919.00	46,717.00	227	59	168	51,580.00	
10	69,771.00	58,749.00	213	66	147	68,198.00	
11	50,050.00	35,366.00	86	42	44	39,502.00	
12	24,460.00	18,982.00	161	53	108	23,585.00	
13	243,597.00	367,836.00	772	247	525	175,362.00	
14	82,650.00	85,543.00	231	98	133	41,943.00	
15	100,063.00	91,910.00	213	72	141	49,408.00	
16	37,655.00	23,610.00	294	119	175	67,430.00	
17	30,474.00	17,760.00	177	46	131	23,526.00	
18	55,426.00	0.00	140	57	83	23,880.00	
19	0.00	3,835.00	109	43	66	10,065.00	
20	11,915.00	0.00	131	38	93	35,180.00	
21	18,600.00	0.00	62	21	41	12,145.00	
MCC	8723.00	735.00	-	-	-	37,318.00	
Total	1,751,216.00	1,414,681.75	5,970	2,186	3,784	1,617,183.00	

Table 5.3-2 Number of ISF Payers and ISF Collection

Note: White shaded area is scheduled to receive irrigation water in spring season,. Deep-grey shaded is the area not to receive irrigation water in spring season under rotation system.

Source: JICA Project Team

MCC has prepared the above list based on the receipts submitted by the collector. Hence, this includes only ISF payers. However, it is very difficult to identify (a) if a user has paid the ISF as per his/her actual irrigable land, (b) whether all users have paid the ISF or not. The key reasons are (a) the list of water users is not regularly updated and (b) most of the works are done manually with a simple excel sheet entered in the computer.

5.3.4 **Membership Fee**

Except SCC 18, no other SCC got new user members into WUA. According to SCC 18 they distributed new membership to 40 members in the last year. According to By-law of WUA, one new member must pay NPR 50.00 as a membership fee.

5.3.5 Renewal Fee

Every user must pay membership renewal fee every year at the time of ISF collection by paying annual renewal fee of NPR 10.00 per user. This assures their voting right also. According to MCC during last year they have collected NPR 59,700.00 in the form of membership renewal fee.

5.4 Meeting

5.4.1 **Regular Meeting**

According to By-law of WUA, the meeting of SCC should be held at least once in a month and may organize more than once if necessary. However, JICA Project Team found that most of the SCCs could not conduct regular meeting in FY 2019/20 and 2020/21 because of COVID-19 pandemic situation as shown in the table below. Before the pandemic, SCC meetings were held as per By-law.

Table 5.4-1 Frequency of Mice	ing (1 1 2017/20 and 1 1 2020/21)
Frequency of meeting	Name of SCC
Regular meeting	SCC 01,10,13,15 and 17
Meeting not conducted	SCC 0,2,3,5,6,8,9,11,12,20 and 21
Intermittent	SCC 4,7,14,16,18 and 19
Source: IICA Project Team	

Table 5.4.1 Frequency of Meeting (FV2019/20 and FV2020/21)

Source: JICA Project Team

During the survey, JICA Project Team also tried to explore the agenda of SCC meeting. It is found that most of agendas are related to irrigation and canal management, rather than agriculture. Irrigation schedule, water distribution, repair and maintenance of canal, funds for irrigation activities were the major agenda. Agenda related to agriculture like farm inputs, marketing, farm labours, farm machinery, cultivation plan etc. were rarely discussed in SCCs.

5.4.2 **Secondary Assembly**

As per By-law of WUA, secondary canal committee must convene assembly once a year. It is found that except SCC 01,10,13,15 and 17 other SCC did not have secondary committee assembly during the study period due to the pandemic situation. The Agenda are mainly focused on irrigation same as secondary canal committee (e.g., irrigation schedule, water distribution, repair and maintenance of canal and funds for irrigation).

Year	Secondary Committee	Secondary Committee Assembly				
	Assembly Held	Not Held				
2019/20	SCC 01,10,13,15 and 17	SCC 0,2,3,4,5,6,7,8,9,11,12,14,16,18,19,20 and 21				
2020/21	SCC 01,10,13,15 and 17	SCC 0,2,3,4,5,6,7,8,9,11,12,14,16,18,19,20 and 21				

Table 5.4-2	Secondary Committe	ee Assembly Held in	FY2019/20 and FY2020/21
	Secondary committee		1 1 2012/20 und 1 1 2020/21

Source: JICA Project Team

5.5 Activity Conducted by SCC

5.5.1 Cropping Calendar

Preparing a cropping calendar is one of the activities of SCC for agricultural activities. However, it is found that only four SCCs (SCC 01,10, 15 and18) have prepared the cropping calendar in 2019 for the year 2019/20. This was one of the activities in the mini-projects, which was implemented in Phase 1 of the Project.

5.5.2 Water Distribution Plan

Regarding preparing a water distribution plan, only four SCCs said that they have prepared the water distribution plan for FY 2019/20 and 2020/21. Except for SCC 0, 01, 10 and 13, the remaining SCCs did not prepare the water distribution plan.

The major reasons for not preparing the water distribution plan are: i) SCC expected to MCC will prepare the plan, ii) SCC does not feel the necessity to prepare the water distribution plan and iii) lack of knowledge to prepare the water distribution plan.

5.5.3 Gate Operation and Water Allocation

JICA Project Team asked the number of gates and gate operation record. All respondents replied that they have not maintained gate operation record.

The gate operation is done along main canal to secondary canal by gate keepers recruited on contract by KIMO. There are few cases that SCCs coordinate for water distribution. The water distribution in secondary canal is done by KIMO with the coordination of MCC.

There is no provision of gate keepers nominated by SCC along secondary canal to tertiary canal. The gate operation are carried out usually by SCC and sometimes users themselves. They all have set an understanding that water distribution from secondary canal to tertiary is done as per necessity of users. SCC tries to distribute water equally and equitably to all users and tries to minimize disputes among users.

The following table shows the number of existing irrigation gate along secondary canal to tertiary canal of KIS.

	8 - 102-		• ·								
SC	0	1	2	3	4	5	6	7	8	9	10
Number of gates	10	8	6	14	15	6	3	6	15	16	5
SC	11	12	13	14	15	16	17	18	19	20	21
Number of gates	No	No	10	5	22	22	12	9	6	4	4
ource: IICA Project Team											

 Table 5.5-1
 Existing Number of Irrigation Gates along Secondary Canal

JICA Project Team asked any sanction activity for diverting water elsewhere against water distribution schedule and illegal water taking but it is found that all SCCs have never conduct such kind of action.

5.5.4 Canal Cleaning

Canal cleaning refers to removal of silts, vegetation and garbage deposited by water users. The canal cleaning is always conducted one a year before rainy season (SCC 15 and 18 ware conducting canal cleaning even before spring season).

According to the respondents, they have been hiring service provider/contract for canal cleaning and they would pay their share in cash to the service provider through the respective SCC The cleaning is done by manually hiring labour and by using excavator as per necessity. SCCs hire excavator from WUA as much as possible since the rent charged by the WUA is lower than charged by other private sources.

From the survey, it was understood that WUA has shouldered the responsibility of canal cleaning works in most of the secondary canals through its excavator. Of 22 SCCs, four SCCs (SC 0, 01, 10 and 15) reported that they had cleaned their respective SCs by themselves. The respondents of SCC 01, 10 and 15 answered that they often hire machinery for canal cleaning works either from WUA or from other individuals based on the availability. SCC 0 neither hires machinery nor involves in canal works using machinery (hand manual due to the condition of sandy soil).

According to SCC 10, they collect the cleaning cost from users if necessary. SCC 01 do not collect any cost from users but use the profit from selling grass. Selling grass taken from canal area is one of the income resources for the SCC 01 besides ISF.

On the other hand, SCC 0 is one of the different from other SCCs for the activities of WUA. In addition of ISF, they collect NPR 900.00 /ha/year as O&M fee from all users for all the activities of canal operation. They perform the canal cleaning works not only for secondary canal but all tertiary canal as well.

5.5.5 Greasing Gates

Greasing of canal gates is the maintenance work which is carried out by KIMO through gate keepers. Not only the gates along MC, but the gate operators also grease the gates of all TCs and SCs.

5.5.6 Walk-through

Since the executive members and office bearer of all SCCs are the water users of the respective canals, and residing along the canal area, the canals are their daily visiting places. They observe the condition of canals and fully aware with the condition of the canal. They emphasized that they do not require or allocate a specific day and time to walk-through canal to identify and observe the canal condition

5.5.7 Minor Repair to Structures/Rehabilitation of Secondary Canal

Generally, minor repair and maintenance of SCs are conducted by SCCs according to their decision. The minor repair and maintenance include repairing of canal bank caused by water erosion or caused by mouse. Minor damage to earth canal is usually repaired by SCC themselves.

However, when they are not able to afford major repair works such as structural damage (canal lining), , SCC requests MCC to get the financial support from KIMO.

During the survey, JICA Project Team collected some information on tertiary canal severely damaged by river which are not in existence or need rehabilitation. The following table will show the current situation of some particular tertiary canals affected by rivers.

Name of SCC	Affected tertiary canal	Damaged by	Description
01	TC-12	Kankai river	Almost all command area of TC-12 which covers around 60 ha of land has drawn by Kankai and cannot be irrigated and cultivated.
04	TC-10 and 12	Kamal river	Some parts of TCC-10 and 12 are affected by Kamal River canal needs rehabilitation.
07	TC-03 and 06	Kankai river	TC-03 is severely damaged by Kankai river and TC-06 is structurally not functioning.
12	TC-13,14 and 15	Kamal river	TC-13,14 and 15 are disconnected with secondary canal and needs rehabilitation.

Table	e 5.5-2	Tertiary	Canal	affected	by	Rivers

Source: JICA Project Team

5.5.8 Construction of Field Channels

During the implementation of mini-project in Phase 1 of the Project, model SCC 01, 10, 15 and 18⁴ have constructed field channels. However, some areas such as SC 10 already have many field channels in the command area. JICA Project Team observed the said field channel constructed by users as shown in Figure 5.2-3.

The attitude of the respondents towards field channel is shown in the following table.

	Table 5.5-5 Responses on Attitude towa	
SN	Attitude towards field channel	No of SCC
1	Farmers are not interested in the construction of field channel	SCC 14
2	Farmers/users are used to flood irrigation (follow the conventional irrigation method)	SCC 0,02,05,15 and16
3	SCC users did not realize the need for the field channel	SCC 0,02,05,06,15,11,13,17,18 and 27
4	Farmers have realize necessity but there is no any responsible agency to construct the field channel	SCC 01,03,04,07,08,9,10,12,16,19 and 20

 Table 5.5-3
 Responses on Attitude towards Field Channel

Source: JICA Project Team

Most of the respondents have agreed that they have felt necessity of field channel but users are not taking any initiation due to uncertainty of resources and agencies to undertake the responsibility of construction work. Some respondents revealed that they never have realised the necessity of field channel to irrigate their field for cultivation. Some respondents admitted that they are used to with flood irrigation so field channels are not their priority.

The respondents answered that the cost of land is so high that the land owner is reluctant to allow even a small piece of his/her land to construct field channel to distribute water to the bordering land owned by others. Rather than field channels, users would prefer to construct farm road so that the price of the land would further increase (value addition through road) whereas the field channel could decrease the land value.

5.6 Irrigation

5.6.1 Water Availability

JICA Project Team tried to explore the availability of irrigation water in canal over the last 5 to10 years in KIS area. The responses are presented in the table below.

⁴ At Phase 1, the Model site was SCC 01, 10, 15 and 18. SCC 18 was replaced with SCC 17 in Phase 2.

Season	SC 0	SC 1	SC 2	SC 3	SC 4	SC 5	SC 6	SC 7	SC 8	SC 9	SC 10
Spring	S	S	NS	FS	FS	NS	FS	FS	NS	NS	FS
Winter	S	S	FS	FS	FS	FS	S	FS	FS	FS	FS
Rainy	S	S	S	S	S	S	S	S	S	S	S
Season	SC 11	SC 12	SC 13	SC 14	SC 15	SC 16	SC 17	SC 18	SC 19	SC 20	SC 21
Spring	NS	NS	S	NS	FS	NS	FS	FS	NS	NS	FS
Winter	NS	FS	S	NS	FS	FS	FS	FS	NS	NS	FS
Rainy	S	S	S	S	S	S	S	S	S	S	S

 Table 5.6-1
 SCC and Water Availability

Note: S: sufficient, FS: Fairly Sufficient, NS: Not Sufficient Source: JICA Project Team

SCC 0, 01 and 13 accept that water availability is sufficient in their canal during spring season irrigation, whereas other 10 SCCs stated that they never had sufficient supply of water in spring season. Likewise, the remaining 9 SCCs have reported having fairly sufficient water in their canal.

SCC 0, 01, 06 and 13 said that they have sufficient supply of water in winter season and SCC 11,14,19 and 20 said they have never had sufficient water in their canal.

During rainy season, the availability of water in every canal is obviously sufficient.

When JICA Project Team also asked to the respondents about the trend of availability of water in secondary canal over the last five years with four possible options, different SCCs had different responses as presented in the table below.

Trend of Irrigation Water availability	Respondent SCC
Improving	SCC 0,1,3,4,6,10,13,15, 17,18,19 and 21
Declining	SCC 2,5,8,11 and 12
Constant	SCC 7,9,14,16 and 20
Do not know	-

 Table 5.6-2
 Trend of Water Availability in SCs over 5 years

Source: JICA Project Team

12 SCC opined that water availability in secondary canal is improving whereas 5 SCC experienced declining and 5 SCCs reported no change /constant.

5.6.2 Irrigated Area

KIS does not have enough water to distribute for all secondary canals all-round year since water is not enough at source during the spring season. KIMO has established a rotational system for water distribution. The group 1 is SC 1 to 12 and the group 2 is SC 13 to 21. Each group receives water in alternate year during spring season. Whereas SC 0 get water every year since the permeability of soil is high in SC 0 so that they cannot construct shallow tube well and cultivate in spring season without canal water.

JICA Project Team tried to confirm the annual irrigated area but there is no authorised record, so JICA Project Team is analysing by the result from the survey on individual farmers (refer to Chapter 6).

5.6.3 **Irrigation Facility List**

All the respondents reported that they don't have maintained list of irrigation facility. They all know about the facility, but have not listed in document.

5.6.4 Facility Maintenance and Rehabilitation Plan

All the respondents reported that they have not made any facility maintenance and rehabilitation plan. They will come into action and maintain/repair the facility based on the needs and urgency of the situation.

5.7 Agriculture

JICA Project Team had tried to find the trend of cultivation in KIS area during different 3 seasons. However, there isn't any authentic data and only the assumption of respondents so JICA Project Team is analysing the results based on individual farmers (refer to Chapter 6).

5.8 Services and Training

5.8.1 Availability of Services from Municipality to SCC

All respondents reported that they have never received any services and facility from municipality to SCC regarding irrigation. Rather, users individually have been benefitted by municipality getting different services on agriculture in the form of agriculture inputs, training and machinery in grant.

5.8.2 Services from AKC to SCC

Regarding services availability from Agricultural Knowledge Centre (AKC) to secondary canal committee, all respondents have same answer that they have not got any services from AKC. However, individual user may have benefitted by getting technical advice, agricultural inputs.

5.8.3 Training

Due to the situation of pandemic, there were limited activities of training programme conducted for water users. Almost all training programme were conducted by KIMO as a regular activity of that office in coordination with MCC as listed below.

SN	Name of Training
1	Vegetable farming
2 Insect pest control	
3 Rice cultivation	
4	Maize cultivation
5	Crop calendar preparation
6	Account management
7	ISF collection
8	Water distribution

Table 5.8-1 List Training Organized by WUA/KIMO

Source: JICA Project Team

5.9 Problems Related to Irrigated Agriculture

JICA Project Team have extracted some problems and possible solutions as shown in the table below. Some problems are specific to the respondent of SCC and some are general applicable to all SCCs.

SCC		1		2	3		
	Problem	Possible Solutions	Problem	Possible Solutions	Problem	Possible Solutions	
SC-00	Cleaning and maintenance of canal is difficult due to land ownership problem of canal area (some area of canal is still under the individual property)	Land acquisition process of canal area must be solved to avoid claim of ownership by individual	Water leakage is high because of earthen structure	Lining is necessary			
SC-01	Spring rice cultivation is being decreased due to not getting appropriate price of product	Provision of dryer, processing plants for spring rice at appropriate location and provision of marketing environment.	There is scarcity of farm labour during cultivation	Provision of farm equipment, machinery equipment through custom hiring centre			
SC-02	Water flow in canal is obstructed due to siltation.	Regular cleaning is necessary and KIMO and MCC must help to SCC and TCC for this matter	Water distribution is not proper due to absence of gate	Gate for controlling water is necessary with pad lock system by SCC to control misuse of water			

SCC		1		2		3		
	Problem	Possible Solutions	Problem	Possible Solutions	Problem	Possible Solutions		
SC-03	Blockage of canal due to throwing wastage in canal by peoples.	Strict administrative action is necessary	Collection of ISF is very low. (Some users do not pay; some users pay very less amount as it to be paid)	A very efficient rule should be implemented from all sector including local government for those who do not pay ISF.	Farmers do not get sufficient price of their spring rice	All the stakeholders should come on a point to address processing, storage, marketing management issues etc.		
SC-04	Water leakage is high due to sandy soil structure and old structure	Lining is necessary	Problem in water distribution due to lack of permanent gate in distribution box	Well-structured permanent gate is to be constructed	TCC 10 and 12 are on risk of damage due to flood on Kamal River	Dam is to be constructed to protect TCC from flood		
SC-05	Canal structure is old enough for proper water supply	Many canals need repairment/rehabilitatio n work to be done by KIMO/WUA	Water distribution is not systematic, only influencing peoples use water as per their wish	Irrigation gate should be locked by authorized person for not to misuse water and to check the malfunction				
SC-06	There is no appropriate water distribution system, users use water based on their interest, without any systematic rules	Water distribution plan and rules within the SCC is needed	Water logging in field	Construction of field channels are necessary				
SC-07	Water supply is poor due to old and damaged structure	Repair and maintenance of canal is must	ISF collection is less than expected (Users do not pay ISF according to land holding size)	Data of land holdings of users must be updated and recorded	Water supply is totally checked due to damaged structure like TC 03	Rehabilitation of canal if feasible		

SCC]	L	2	2	3	3
	Problem	Possible Solutions	Problem	Possible Solutions	Problem	Possible Solutions
SC-08	Water supply in canal is not regular and sufficient	KIMO/WUA should undertake the work to ensure regular and sufficient water supply	Collection of ISF is very low.(Some users do not pay ; some users pay very less amount as it to be paid)	A very efficient rule should be implemented from all sector including local government for those who do not pay ISF.		
SC-09	Farmers are not getting reasonable price of their products	Minimum price should be fixed by government	Agriculture inputs are not getting on time.	Ensure inputs supply in time by state	Influence of Indian market	Subsidy is to be provided by government
SC-10	Farmers are not getting reasonable price of their products	Ensure marketing environment, provision of cold stores, drying yard etc.	Agriculture inputs like fertilizer, seed etc. not easily available in time	Ensure timely availability of agriculture inputs by government level	Difficulty in transportation and farm activities along canal road due to earthen road structure	At least canal road should be gravelled
SC-11	SC are not functioning, No irrigation water during spring and winter season.	Rehabilitation of SC and TC is needed. Responsibility should be hand overed to particular SCC	All irrigation system is damaged	Awareness raising among farmers,	Difficult in fertilizers and market management to farmers	Practice good governance in development initiatives
SC-12	12 TCs cannot get enough supply of water	KIMO/WUA should undertake the work to ensure regular and sufficient water supply	TC 13, 14 and 15 has been disconnected from flood and totally unusable.	A technical study is necessary for rehabilitation of the damaged canal		

SCC	:	1		2	3		
~	Problem	Possible Solutions	Problem	Problem Possible Solutions		Possible Solutions	
SC-13	There are water leakage in many TCs due to old and damaged structure	Maintenance of canal is most necessary					
SC-14	Canals are damaged	Vertical and lining of SC is very much necessary					
SC-15	No water on TC 14,15 and 16	Rehabilitation of defective TCs	Water wastage is more due to flooded irrigation	Construction of field channel	Scarcity of labour during canal cleaning	Provide Small bucket excavator	
SC-16	Tertiary canal are not well developed and users are not getting irrigation water properly	Tertiary canal is to be well constructed with enough number of gate and field channel for proper distribution of water	ISF collection is very low than expected due to lack of strict rule	Local government should be involved for implementation of rule to collected ISF			
SC-17	Irrigation water supply is poor in TC 2, 5, 7 and 8	Rehabilitation of TC 2,5,7 and 8 must be done by KIMO and WUA	Water wastage is high due to flooded irrigation	Field channel should be constructed for efficient water distribution			

SCC	:	1		2		3
	Problem	Possible Solutions	Problem	Possible Solutions	Problem	Possible Solutions
SC-18	Canals get affected due to construction of road by local municipality	Coordination among WUA, KIMO and local municipality is necessary while constructing the road	TC-3, do not have well- functioning structure	Rehabilitation is necessary	Users do not pay actual amount of ISF as per land holdings	Data base of land holdings is to be updated
SC-19	Due to lack of well- developed tertiary canal water distribution to farmer's field is not enough	TC is to be developed including field channel to improve the water supply	In some sites SC is lying lower than most of the cultivable land and it is unable to irrigate land by canal	Some rehabilitation work should be done after thorough study by technician to increase the water supply	ISF collection is low from farmers due to not getting necessary facilities regarding irrigation	Solution 1and2
SC-20	Due to lack of well- developed tertiary canal water distribution to farmer's field is not enough. There are no gates to control water	TC is to be developed including field channel to improve the water supply	Water supply is not enough in TCC	Water distribution can be improved by some structural arrangement at Jhamak chok (Starting point of Reach 5)	Water leakage is high due to high porosity property of soil	Lining of canal may be the best solution.
SC-21	Most of the land holders do not reside in the SC area and ISF collection is not timely and not sufficiently collected	Database of landholders should be updated by which SC might inform them who are absent in the command area.	TCC -04 is not well developed and water flows uncontrollably. People do not feel necessary of this canal	KIMO and all committee of WUA should take initiation in this matter	Inactive secondary committee and TCC	Formation of active committee

Source: JICA Project Team

CHAPTER 6 INDIVIDUAL FARMER

6.1 Introduction and Survey Method

JICA Project Team interviewed 334 farmers of the four municipalities, namely Gauradaha, Gauriganj, Kamal, and Shivasatakshi, located in the Kankai Irrigation Scheme (KIS), as part of this baseline survey. The following table shows the steps to conduct the baseline survey. Prior to initiating the baseline survey on individual farmers, baseline methodology and the draft baseline questionnaire were prepared and shared among the Project Task Team members to ensure common understanding, consistency and get necessary inputs/feedbacks.

Step 1	Review of verifiable indicators in PDM
Step 2	Design of survey methodology
Step 3	Preparation of survey questionnaire
Step 4	Training of enumerators and pretesting
Step 5	Survey execution
Step 6	Data input, cleaning, analysis

 Table 6.1-1
 Steps to conduct Baseline Survey

Source: JICA Project Team

The basic principles followed by JICA Project Team to undertake the survey were as follows:

- i) Considering the COVID-19 negative effect on Kankai Canal Water Users Association (WUA) and farmer activities in Kankai Irrigation Scheme, the Project shall carry out data collection for 2-years: 2019-2020 (without COVID-19), 2020-2021 (with COVID-19).
- ii) The questionnaire shall be prepared for i) basic data collection for PDM indicator and ii) basic survey and analysis on the Project area.

JICA Project Team selected 334 farmers representing 22 secondary canals (SCs) as shown in Table 6.1-2. At the four model SCC, 10 farmers are selected from the model tertiary canal committee (TCC) and others are from other non-model TCCs. The purpose of disaggregating respondents by model and non-model TCCs was to provide comparison group for the end line survey/ final evaluation. As shown in Table 6.1-3, the location of agricultural land were also considered to take the effect of water distribution from the head, middle and tail parts of SCCs. Most of SCCs are located in Shivasatakshi municipality, the number of individual farmers interviewed was the highest in this municipality, followed by Gauradaha, Gauriganj and Kamal.

	Ma	ile	Fem	ale	Total			
SCC No	Number of RespondentPercentage(%)		Number of RespondentPercentage(%)		Number of Respondent	Percentage in Total Respondents (%)		
SCC 0	9	60.0	6	40.0	15	4.5		
SCC 1	13	81.3	3	18.8	16	4.8		
Model TCC	7		3		10			
Others	6		0		6			
SCC 2	12	80.0	3	20.0	15	4.5		
SCC 3	9	60.0	6	40.0	15	4.5		
SCC 4	11	73.3	4	26.7	15	4.5		

 Table 6.1-2
 Number of Respondent and Gender by SCC

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	Ma	ale	Fem	nale	Total		
SCC No	Number of	Percentage	Number of	Percentage	Number of	Percentage in Total	
	Respondent	(%)	Respondent	(%)	Respondent	Respondents (%)	
SCC 5	8	53.3	7	46.7	15	4.5	
SCC 6	12	80.0	3	20.0	15	4.5	
SCC 7	14	93.3	1	6.7	15	4.5	
SCC 8	13	86.7	2	13.3	15	4.5	
SCC 9	12	80.0	3	20.0	15	4.5	
SCC 10	13	81.3	3	18.8	16	4.8	
Model TCC	8		2		10		
Others	5		1		6		
SCC 11	7	46.7	8	53.3	15	4.5	
SCC 12	11	73.3	4	26.7	15	4.5	
SCC 13	14	93.3	1	6.7	15	4.5	
SCC 14	12	85.7	2	14.3	14	4.2	
SCC 15	15	88.2	2	11.8	17	5.1	
Model TCC	8		2		10		
Others	7		0		7		
SCC 16	12	80.0	3	20.0	15	4.5	
SCC 17	12	75.0	4	25.0	16	4.8	
Model TCC	6		4		10		
Others	6		0		6		
SCC 18	10	66.7	5	33.3	15	4.5	
SCC 19	9	60.0	6	40.0	15	4.5	
SCC 20	14	93.3	1	6.7	15	4.5	
SCC 21	11	73.3	4	26.7	15	4.5	
Total	253	75.7	81	24.3	334	100.0	

Source: JICA Project Team

Table 6.1-3 Agricultural Land Position in KIS Canal

	Gauradaha Gauriganj (n=87) (n=57)			nj)	Kamal (n=35)			Shivasatakshi (n=155)			Total (n=334)				
	No	Area (ha)	%	No	Area (ha)	%	No	Area (ha)	%	No	Area (ha)	%	No	Area (ha)	%
Head	23	21.8	18.3	21	26.3	33.1	10	6.8	25.9	68	48.9	41.7	122	103.8	30.3
Mid	37	52.9	44.4	21	22.9	28.9	14	12.2	46.4	62	44.7	38.1	134	132.8	38.8
Tail	32	44.4	37.3	28	30.2	38.1	12	7.3	27.7	33	23.6	20.2	105	105.6	30.9

Note: multiple answer is allowed in this question Source: JICA Project Team

Table 6.1-4 The Models SCC and TCCs by Municipality

	Gaurada	ha	Gauriga	nj	Kamal		Shivasatakshi		То	tal
SCC	(n=87))	(n=57)		(n=35)		(n=155)	(n=334)		
	SCC	No	SCC	No	SCC	No	SCC	No	No	(%)
Model	SCC17,	10	SCC 10,	10	SCC15,	10	SCC 1, TCC6	10	40	12
TCC	TC2		TC11		TCC10/11					
Model	SCC 17	7	SCC 10	2	SCC 15	6	SCC 1 Other than	10	25	7.5
SCC	other than		other than		other than		TC 6 +SCC 10			
	TCC 2		TCC 10		TCC10/11		other than TCC 10			
Non	SCC 16,	70	SCC 7, 8,	45	SCC 14,	19	SCC 0, 2, 3, 4, 5, 6,	135	269	80.
Model	18, 19,		11, 12		16		7, 8, 9, 13			5
	20, 21									
Total		87		57		35		155	334	100
C	D T									

Source: JICA Project Team

Finally, a flow diagram below shows the steps followed by JICA Project Team to undertake individual farmers survey.



Source: JICA Project Team

Figure 6.1-1 Steps Followed in the Finalization of the Individual Farmer Questionnaire

Attachment 6.1 presents the final survey questionnaire administered in the field to interview farmers. The surveyors followed the following steps to select and interview farmers which were supervised, inspected and monitored for quality control and credibility of the interview.

	Table 6.1-5 Steps to Select of the Respondent for Baseline Survey
Step 1	Report to the WUA, MCC Office, Janata Chawk, Shivasatakshi
Step 2	Get assistance of WUA MCC Office Secretary to introduce to the SCC Chairperson
Step 3	Report to the respective SCC Chairperson
Step 4	Introduce and get his assistance to identify head, middle and tail part of the SC
Step 5	Select three TCCs located in head, middle and tail part of the SCC with the assistance of the SCC chairperson
Step 6	Visit selected individual farmers and interview complying to COVID-19 protocols (Photo below)

Source: JICA Project Team

6.2 **Basic Information on Respondent**

6.2.1 Socio-economic Characteristic

The following table shows socio-economic characteristic of the respondents in KIS. Among the total respondents there were 253 males (75.7%) and 81 female (24.3%). The highest number of respondents were from Shivasatakshi municipality that is 155 and number of male and female are 117 and 38, respectively.

Out of 334 respondents, 124 respondents (37.1%) have attained basic level (grade 1-8 level) of education whereas 122 respondents (36.5%) have passed the secondary level (class 10). Likewise, 29 respondents (8.7%) have passed the higher secondary level (class 12) and 14 respondents (4.2%) have education level of graduation and above. 45respondents (13.5%) have no formal education level.

Most respondents are from Brahmin /Chhetri /Thakuri /Sanyasi, which comes 71.6% (239 respondents) out of total respondents. Likewise, ethnicity Janajati comes in second position that is 27.8% (93 respondents) and Dalit comes in the third position that is 0.6% (2 respondents).

Table 6.2-1 Socio-economic Characteristics of Respondent												
	Gaur	adaha	Gaur	iganj	Ka	ımal	Shivasa	atakshi	To	otal		
	(n=	:87)	(n=	57)	(n=	=35)	(n=1	55)	(n=	334)		
	No	%	No	%	No	%	No	%	No	%		
Gender												
Male	64	73.6	41	71.9	31	88.6	117	75.5	253	75.7		
Female	23	26.4	16	28.1	4	11.4	38	24.5	81	24.3		
Education												
No Formal Education	5	5.7	16	28.1	6	17.1	18	11.6	45	13.5		
Basic (Grade 1-8)	29	33.3	19	33.3	13	37.1	63	40.6	124	37.1		
Secondary (10 pass)	40	46.0	15	26.3	13	37.1	54	34.8	122	36.5		
Higher Secondary (12 pass)	8	9.2	4	7.0	3	8.6	14	9.0	29	8.7		
Graduation and above	5	5.7	3	5.3	0	0.0	6	3.9	14	4.2		
Ethnicity												
Brahmin /Chhetri /Thakuri /Sanyasi	84	96.6	26	45.6	31	88.6	98	63.2	239	71.6		
Janajati	3	3.4	31	54.4	4	11.4	55	35.5	93	27.8		
Dalit		0.0	0	0.0	0	0.0	2	1.3	2	0.6		
Others	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0		

Table 6.2-1	Socio-economic	Characteristics o	f Respondent
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Source: JICA Project Team

6.2.2 Average Number of Family Member

According to the following table, the average number of family member per household of four municipality is 5.3. Age group of 15-60 occupies the highest position which is 63.4% and other age group above 60 and under 15 takes the second and the third position which are 19.2% and 17.5% respectively.

	Table 0.2-2 Average Number of Family Member per Household												
	Gauradaha		Gaur	iganj	Ka	mal	Shivas	atakshi	Total				
	(n=	87)	(n=57)		(n=35)		(n=155)		(n=3	334)			
	No	%	No	No %		%	No	%	No	%			
Under 15	1.0	17.9	1.3	23.3	1.1	20.4	0.7	14.2	0.9	17.5			
15 to 60	3.4	60.8	3.4	61.8	3.5	68.5	3.3	64.4	3.4	63.4			
60 and above	1.2	21.4	0.8	14.8	0.6	11.0	1.1	21.5	1.0	19.2			
Total	5.6	100.0	5.6	100.0	5.2	100.0	5.1	100.0	5.3	100.0			

Table 6.2-2 Average Number of Family Member per Household

Source: JICA Project Team

The following table shows that involvement of female in agriculture profession is higher than male in four municipality. It reveals that 2.6 members (49.0%) of total family members (5.3 members) are engaged in agriculture. Out of the average number of family member per household, 1.4 are female and 1.2 are male which is 27% and 22%, respectively.

 Table 6.2-3
 Average Number of Family Member who are Engaged in Agriculture per
 Household

	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi	Total (n=334)		
	No	%	No	%	No	No % N		%	No	%
Male	1.1	21%	1.3	24%	1.1	20%	1.2	22%	1.2	22%
Female	1.3	23%	1.5	26%	1.5	29%	1.5	28%	1.4	27%
Total	2.4	44%	2.8	50%	2.5	49%	2.6	51%	2.6	48%

Note: Percentage means Average Number of Family Member who are Engaged in Agriculture / Average Number of Total Family Member Source: JICA Project Team

6.2.3 Occupation

As shown in the following figure, agriculture is the first occupation in KIS as the same as national scenario. Of the total respondents, 73.7% of the respondents have admitted that agriculture is the key occupation for their income source. The second main income source is remittance from abroad which occupies second position (10.8%).

Particulars	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Agriculture	74	85.1	40	70.2	32	91.4	100	64.5	246	73.7
Retail shop/grocery (village)	1	1.1	3	5.3	0	0.0	6	3.9	10	3.0
Contractor	1	1.1	2	3.5	0	0.0	6	3.9	9	2.7
Service	3	3.4	4	7.0	0	0.0	21	13.5	28	8.4
Remittance (Abroad)	8	9.2	5	8.8	2	5.7	21	13.5	36	10.8
Farm Labour	0	0.0	3	5.3	1	2.9	1	0.6	5	1.5

Table 6.2-4	First Occupation of Household

Source: JICA Project Team

6.2.4 Landownership and Total Land Holding Area

The following table shows that 310 respondents (92.8%) are land owner in KIS area among the total respondent (334 respondents). 6.9% of the respondents rented out their land to others and 4.8% of the respondents are those type of farmers who lease land from others under crop sharing.

	Iuu		Lunu	Holum	<u> </u>	or mous	cholu			
Particulars	Gaura (n=	adaha 87)	Gauriganj (n=57)		Kamal (n=35)		Shivas (n=)	atakshi 155)	Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Land owner	68	78.2	54	94.7	34	97.1	154	99.4	310	92.8
Land owner, rented out (in cash) and shared to others for farming	17	19.5	0	0.0	1	2.9	5	3.2	23	6.9
Leased land from others under crop sharing arrangement (Household is	5	5 7	2	5.2	0	0.0	0	5.0	16	4.0
landless)	5	5.7	3	5.3	0	0.0	8	5.2	16	4.8
Firm/Company	0	0.0	0	0.0	0	0.0	1	0.6	1	0.3

 Table 6.2-5
 Land Holding Type of Household

Remarks: Multiple answer were included in this question

Source: JICA Project Team

The following table shows land holding area per household including houses, agriculture and other services. The average land holding per household is 1.41 ha which is derived by subtracting rented out and provided for share cropping from total of owned land, lease contract and received for share cropping. The average land holding area is the highest in Gauradaha (1.93 ha) and the lowest in Shivasatakshi (1.02 ha). It is assumed that urbanisation is progressing in Shivasatakshi, resulting land fragmentation.

		Average	Area per house	hold (ha)	
	Gauradaha	Gauriganj	Kamal	Shivasataks	Total
	(n=87)	(n=57)	(n=35)	hi (n=155)	(n=334)
1. Owned by HH	1.27	1.12	0.83	0.86	1.01
2. Rented in/lease contract	0.82	0.65	0.30	0.18	0.44
3. Rented out/lease contract	0.03	0.10	0.01	0.08	0.06
4. Received for share cropping	0.14	0.12	0.24	0.10	0.13
5. Provided for share cropping	0.27	0.00	0.10	0.04	0.10
Total (1+2-3+4-5)	1.93	1.78	1.26	1.02	1.41

 Table 6.2-6
 Land Holding Area per Household

Source: JICA Project Team

6.2.5 Agricultural Land Area

According to the following table, the average agriculture land area is 1.28 ha which consist fishery and livestock farming area. The average agricultural land for only crops are the highest in Gauradaha (1.79 ha) followed by Gaurigunj (1.52 ha), Kamal (1.12 ha), Shivasatakshi (0.82 ha).

	Gaura (n=8	daha 37)	Gauriganj (n=57)		Kamal	(n=35)	Shivas (n=	atakshi 155)	Total (n=334)	
	Area (ha)	Avera ge (ha)	Area (ha)	Averag e (ha)	Area (ha)	Avera ge (ha)	Area (ha)	Avera ge (ha)	Area (ha)	Avera ge (ha)
Total land	167.8	1.93	101.5	1.78	44.0	1.26	157.7	1.02	471.0	1.41
Agricultural Land	165.1	1.90	88.5	1.55	43.5	1.24	129.8	0.84	426.9	1.28
Agricultural Land for Crops	155.9	1.79	86.86	1.52	39.31	1.12	126.9	0.82	409.0	1.22

 Table 6.2-7
 Average Agricultural Land Area per Household by Municipality

Note: Crop is inclusive of cereals, cash crops, fruits, vegetables etc. Source: JICA Project Team

The following table shows that average total land per household is the highest in SCC 20 (2.43 ha) and so is the average agriculture land (2.37 ha) and only for crop (2.30 ha). There is a tendency that upstream of KIS is progressing land fragmentation.

Table 6.2-8	Agricultural Land	Area per Househo	ld by SCC

		Total Land		Agı	ricultural L	and	Agricultural Land for Crops			
SCC No	No	Area (ha)	Averag e (ha)	No	Area (ha)	Averag e (ha)	No	Area (ha)	Averag e (ha)	
SCC 0	15	9.6	0.64	15	8.1	0.54	15	8.0	0.53	
SCC 1	16	16.7	1.04	16	13.1	0.82	16	13.0	0.82	
Model TCC	10	10.0	1.00	10	6.9	0.69	10	6.8	0.68	
Others	6	8.7	1.45	6	6.3	1.04	6	6.2	1.03	
SCC 2	15	15.4	1.03	15	13.8	0.92	15	13.8	0.92	
SCC 3	15	11.0	0.73	15	8.8	0.59	15	8.7	0.58	
SCC 4	15	13.0	0.87	15	10.7	0.71	15	10.7	0.71	
SCC 5	15	12.8	0.85	15	10.7	0.72	15	10.6	0.71	
SCC 6	15	24.0	1.60	15	19.9	1.33	15	19.5	1.30	
SCC 7	15	21.3	1.42	15	17.2	1.14	15	17.2	1.14	
SCC 8	15	20.2	1.35	15	18.3	1.22	15	17.3	1.16	
SCC 9	15	16.8	1.12	15	15.2	1.01	15	14.9	0.99	

Total Land Agricultural Land Agricultural Land for Crops SCC No Area Averag Area Averag Area Averag No No No (ha) e (ha) (ha) e (ha) (ha) e (ha) SCC 10 16 24.1 1.51 16 20.2 1.26 16 19.6 1.23 Model TCC 10 17.0 1.70 10 14.7 1.47 10 14.3 1.43 Others 6 7.1 1.19 0.92 6 0.89 6 5.5 5.4 SCC 11 15 27.2 1.81 15 24.2 1.61 15 23.9 1.59 SCC 12 15 32.2 2.15 15 28.7 1.91 15 27.7 1.84 SCC 13 15 11.0 0.74 15 0.63 15 0.59 9.4 8.8 SCC 14 14 13.3 0.95 14 11.9 0.85 14 10.7 0.76 SCC 15 17 24.1 1.42 17 22.6 1.33 17 20.8 1.22 Model TCC 10 14.5 1.45 10 13.5 1.35 10 12.6 1.26 Others 7 9.6 1.38 7 9.1 1.30 7 8.2 1.18 SCC 16 15 1.79 15 1.69 15 23.3 1.55 26.9 25.4 SCC 17 16 30.6 1.91 16 27.1 1.69 16 23.8 1.49 Model TCC 10 16.4 1.64 10 14.2 1.42 10 12.7 1.27 14.2 2.37 2.14 Others 6 12.8 6 11.1 1.85 6 **SCC 18** 15 32.8 2.19 15 31.6 2.10 15 30.4 2.03 SCC 19 15 22.0 1.47 15 20.2 1.35 15 18.5 1.23 SCC 20 15 36.5 2.43 15 2.37 15 34.5 2.30 35.6 SCC 21 15 35.3 2.35 15 34.4 2.29 15 33.2 2.21 Total 334 471.0 1.41 334 426.9 1.28 334 409.0 1.22

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Note: Crop is inclusive of cereals, cash crops, fruits, vegetables etc. Source: JICA Project Team

6.2.6 Shallow Tube Well

Out of total respondents, 63.2 % of the respondents (211) have installed shallow tube well (STW) for the purpose of irrigation. Among them, 82.8% of the respondents from Gauradaha and 80.7% from Gauriganj (middle and tail side of main canal) have installed STW, whereas 54.3% and 47.7% of the respondents from Kamal municipality and Shivasatakshi municipality respectively (head side of main canal) have installed STW.

		I dole of	> Diate		on Iuse	THE OF THE	amerpanej			
Gauradaha (n=87) Gauriganj (n=57)			nj (n=57)	Kamal	(n=35)	Shivasatak	shi (n=155)	Total (n=334)		
No	%	No	%	No	%	No	%	No	%	
72	82.8	46	80.7	19	54.3	74	47.7	211	63.2	
Courses HCA	Ducient Term									

 Table 6.2-9
 Status of Shallow Tube Well by Municipality

Source: JICA Project Team

As shown in the following table, SCC 18 has the highest number of STW (100%) and the second comes SCC 10 (93.8%). Whereas the lowest number of shallow tube well installation is SCC 0 with 6.7% and SC 01 with 12.5%.

SCC No	Total Respondent	Number of Respondent	Percentage	SCC No	Total Respondent	Number of Respondent	Percentage
SCC 0	15	1	6.7	SCC 11	15	13	86.7
SCC 1	16	2	12.5	SCC 12	15	11	73.3
Model TCC	10	0	0.00	SCC 13	15	7	46.7
Others	6	2	33.3	SCC 14	14	7	50.0
SCC 2	15	10	66.7	SCC 15	17	10	58.8
SCC 3	15	7	46.7	Model TCC	10	5	50.0
SCC 4	15	5	33.3	Others	7	5	
SCC 5	15	5	33.3	SCC 16	15	11	73.3
SCC 6	15	13	86.7	SCC 17	16	12	75.0
SCC 7	15	12	80.0	Model TCC	10	9	90.0
SCC 8	15	7	46.7	Others	6	3	50.0
SCC 9	15	12	80.0	SCC 18	15	15	100.0
SCC 10	16	15	93.8	SCC 19	15	13	86.7
Model TCC	10	10	100	SCC 20	15	12	80.0
Others	6	5	83.3	SCC 21	15	11	73.3
Total	334	211	63.2				

Table 6 2 10	Status	of Shollow	Tubo	Wall	by SCC
1 able 6.2-10	Status	of Snallow	I upe	weit	DV SUU

Source: JICA Project Team

6.2.7 Membership in WUA, Cooperatives and Farmer Groups

The following table shows the period that the respondents joined in WUA. 24.6% of the total respondents (82) said that they have joined WUA during 2004-2013. It is due to the completion of phase 2 development. Other periods are all less than 20%, which means generational change or new settlement is continuously happened.

Table 0.2-11 The Teat Johning WCA										
	Gauradaha		Gauriganj		Kamal		Shivasatakshi		Total	
	(n=87)		(n=57)		(n=35)		(n=155)		(n=334)	
	No	%	No	%	No	%	No	%	No	%
Before 1984	0	0.0	15	26.3	0	0.0	44	28.4	59	17.7
1984-1993	2	2.3	5	8.8	3	8.6	27	17.4	37	11.1
1994-2003	3	3.4	17	29.8	9	25.7	33	21.3	62	18.6
2004-2013	36	41.4	6	10.5	13	37.1	27	17.4	82	24.6
After 2013	28	32.2	12	21.1	2	5.7	17	11.0	59	17.7
No response	18	20.7	2	3.5	8	22.9	7	4.5	35	10.5

 Table 6.2-11
 The Year Joining WUA

Source: JICA Project Team

The number of farmers who have joined the WUA after the commencement of WUA are mostly from migrated peoples to KIS command area as shown in the following table. Out of total respondents, 77 respondents (23.1%) are migrated people to KIS area from other location. The second highest answer is
due to property division specially land division among brothers whose fathers were residing in KIS area from very beginning, which account 9.9% weightage.

	Gaura (n=	Gauradaha (n=87)		iganj 57)	Kamal (n=35)		Shivasatakshi (n=155)		To (n=3	tal 334)
	No	%	No	%	No	%	No	%	No	%
Migrated to KIS command	7	8.0	14	24.6	7	20.0	49	31.6	77	
area										23.1
Procured land located in the	0	0.0	1	1.8	0	0.0	14	9.0	15	
KIS command area										4.5
Property division among	3	3.4	5	8.8	3	8.6	22	14.2	33	
brothers										9.9
Other member of the HH was	8	9.2	2	3.5	0	0.0	2	1.3	12	
the member but I inherited										3.6
Any other specify	6	6.9	1	1.8	0	0.0	1	0.6	8	2.4

Table 6.2-12	Number of Farmers	Joining WUA after t	the Commencement of WUA
	rumper of rummers	Johning it critation t	the commencement of violat

Note: Ohers reasons include Member of KIS before distribution, Share Cropping, No response Source: JICA Project Team

As shown in the following figure, out of the total respondents, 50% of the total respondent have taken the membership of agricultural cooperative. Gauradaha municipality consists highest number of respondents (90.8%) who have taken the membership of cooperative and Kamal municipality have least number of respondents (2.9%). Likewise, out of total respondents, 30.5% of the respondents are member of farmers group and Gauradaha municipality deserve the highest number (47.1%).

Table 6.2-13	Member of	Agricultural Coo	perative and Farmer	Group
		0	T	

	Gauradaha (n=87)		Gaur (n=	(n=57) Kamal (n=35)		(n=35)	Shivas (n=1	atakshi 155)	Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Member of Agricultural										
Cooperative	79	90.8	30	52.6	1	2.9	57	36.8	167	50.0
Member of										
Farmer										
Group	41	47.1	6	10.5	4	11.4	51	32.9	102	30.5

Source: JICA Project Team

6.3 Household Income and expenditure

Sections below analyses household income and expenditure. Increased agricultural income (crop sources only) of the Project's target farmers is one of the PDM indicators. The section provides the average data of the whole KIS. It is noted that agricultural income of the Project's target farmers are to be surveyed after the target farmers in model SCCs /TCCs /DTOCs are finally selected from each model SCCs/TCCs for market-oriented agriculture (CAP).

For understanding the current scenario over the KIS area, JICA Project Team asked the respondents to state their annual gross income by the different sources such as income from cereal crops, oilseeds, pulses, and vegetables, fruits from crops, livestock farming, fish farming, remittance, grocery, services, and social security, instead of directly requesting to mention annual income.

Besides this, the respondents were also asked to state annual expenditure by sources. The purpose of asking expenditure details was to trace if any respondent household had a high difference between the annual income and expenditure and find how the household managed their expenditures when the

income was lower and under COVID-19 situation. This question further helped JICA Project Team to capture whether the respondents provided reliable income data or not.

Nevertheless, JICA Project Team understands that a few respondents may still be tended for not to provide actual income. Hence, respondents were requested to tell gross income, and the number of respondents was kept substantially high-, more than 30 in all municipalities so that the average figure would provide credible and trustworthy income and expenditure values. Meanwhile, JICA Project Team tried to detect overinflated and deflated income and expenditure data provided by the respondents based on the criteria such as land size, occupations and number of working household members. This ensured the reliability of income and expenditure details provided by the respondents.

6.3.1 Income and Expenditure

Data presented in Table 6.3-1 show that the total average annual income of the respondent households was NPR 403,700 in 2020-21 with the highest in Gauradaha (NPR 537,700), followed by Kamal (NPR 440,7000), Gauriganj (NPR 356,800) and Shivasatakshi (NPR 337,300). Of the total income, the share of agriculture was highest in Gauradaha (42.7%), followed by Gauriganj, Kamal, and Shivasatakshi, respectively. Overall, this baseline survey estimated average annual agricultural income (crops) at NPR 94,400 with the highest NPR 156,600 in Gauradaha, followed by Gauriganj (NPR 105,300), Kamal (NPR 88,000), and the lowest in Shivasatakshi (NPR 56,900). As seen in Table 6.3-2, of the total agricultural income, the percentage income earned from crops was highest in Gauriganj (74.5%), followed by Gauradaha, Kamal, and Shivasatakshi (48.9%). While there could be multiple reasons for the high agricultural income from crops in Gauradaha, the most understandable reason is the highest average landholding size (1.33 ha). The other undeniable reason could be high access to shallow tube well (STW) irrigation in Gauradaha and Gauriganj municipalities, which provided a year-round irrigation facility and enabled farmers to irrigate their crops when KIMO would not distribute water based on its rotational water distribution system owing to the shortage of water.

SN Incomo		Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
SIN	Income	(NPR '000)	(%)	(NPR '000)	(%)	(NPR '000)	(%)	(NPR '000)	(%)	(NPR '000)	(%)
1	Agriculture	229.8	42.7	141.5	39.6	161.3	36.6	116.2	34.5	154.9	38.4
1.1	(Crops)	156.6	29.1	105.3	29.5	88.0	20.0	56.9	16.9	94.4	23.4
1.2	(Other Sources)	73.2	13.6	36.2	10.1	73.3	16.6	59.4	17.6	60.5	15.0
2	Non-agriculture	307.9	57.3	215.4	60.4	279.5	63.4	221.0	65.5	248.8	61.6
3	Total	537.7	100.0	356.8	100.0	440.7	100.0	337.3	100.0	403.7	100.0

Fable 6.3-1	Average Household	Agricultural	Income by	Municipalit	v
					J

Note: Crop includes cereal, vegetable and fruit. Other sources includes fishery and livestock Source: JICA Project Team

Table 6.3-2	Percentage of Cro	n in Average l	Household Agriculture	Income by Municipality
	I ci contage oi ci o	p m m voruge i	iouschola ligitcultule	meome by municipanty

Incomo	Gauradaha	Gauriganj	Kamal	Shivasatakshi	Total
Income	(n=87)	(n=57)	(n=35)	(n=155)	(n=334)
Agriculture Income (NPR '000)	229.8	141.5	161.3	116.2	154.9
Crop Source in Agriculture Income					
(NPR '000)	156.6	105.3	88.0	56.9	94.4
Percentage of Crop Source in					
Agriculture Income (%)	68.2	74.4	54.5	48.9	61.0
Note: Crop includes cereal vegetable and fruit					

Note: Crop includes cereal, vegetable and fru Source: JICA Project Team

Tuble die e miterage mousendra er op medine per meetare by mainerpunty									
	Gauradaha	Gauriganj	Kamal	Shivasatakshi	Total				
	(n=87)	(n=57)	(n=35)	(n=155)	(n=334)				
Agriculture Land for Crop (ha)	1.79	1.52	1.12	0.82	1.22				
Crop Source in Agriculture Income									
(NPR '000/HH)	156.6	105.3	88.0	56.9	94.4				
Crop Source in Agriculture Income									
(NPR '000/ HH / ha)	87.5	67.9	70.9	67.7	73.7				

Tuble die e Tiverage Household er op meenie per meetare by municipanty	Table 6.3-3 Ave	erage Household Cro	p Income per	r Hectare by	Municipality
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Note: Crop includes cereal, vegetable and fruit.

Source: JICA Project Team

The JICA Project team also estimated the agricultural income disaggregated by crop and other sources by model TCCs, model SCCs and non-model SCCs. The data presented below in the following table show that there is no substantially difference in the agricultural income through crop sources in the sites, though a little high in model TCC (NPR 97,300), followed by model SCC (NPR 95,300) and the non-model SCC (93,900). Understandably, little high income in model TCC and SCC could be the result of model SCC/TCC selection. These SCC and TCC are active and the members have been motivated to improve their agricultural income and irrigation facilities since the first phase of the Project. Of the four model SCCs, except one in Gauradaha (SCC 17), all three SCC were also the model sites where micro-projects were implemented under the first phase of the Project.

SN	Income	Model TCC	Model SCC	Non Model SCC	Total						
1	Total Income (NPR '000)	415.1	434.3	382.6	403.7						
2	Agricultural Income (NPR '000)	134.6	283.8	145.9	154.9						
3	Crop Income in Agriculture Income (NPR '000)	97.3	95.3	93.9	94.4						
4	Percentage of Crop Sources in Average Agriculture Income (%)	72.3	33.6	64.4	61.0						

 Table 6.3-4
 Average Agricultural Income by SCCs

Note: Crop includes cereal, vegetable and fruit.

Source: JICA Project Team

Data presented below in Table 6.3-5 show that, overall, a household spends approximately NPR 275,000 per year, which is almost 68.1% of the total income. The total data show that 32.6% of the total households (HHs) had an income higher than the annual expenditure. However, this does not mean that the people have adequate savings. As seen from the data presented below in Table 6.3-5, most people have taken loans from banks and cooperatives and paid substantial interest to the loan providers. Data reveal that 8.4% of the total expenditure is spent on interest to pay to the loan providers. Similarly, the survey data show the percentage of HH expenditure on the electric bill for using STW facility almost 5 times higher than that paid to the ISF in KIS because STW fee is very high. The respondents have been paying NPR 50 to NPR 80 per hour when they hire STW/pump for irrigation purposes.

The percentage of household expenditure on food is relatively satisfactory. Overall, 24.3% of the total expenditure is spent on food, with the highest in Shivasatakshi (27.5%), followed by 26.8% in Gauriganj, 22.4% in Kamal, and 19.3% in Gauradaha. In terms of expenditures on different items, the highest was found in food (24.3%), followed by agriculture production (22.2%), education (14.1%), utilities (11.6%), health/medical (9.6%), and interest payment (8.3%) and clothing (6.7%). The percentage of expenditure on food was almost equal to agriculture production (24.3% vs. 22.2%), but the proportion was relatively highest in Gauradaha (26.8%), followed by Kamal (25.2%), Shivasatakshi (24.6%), and Gauriganj

(23.3%). This suggests that households spend almost one-fifth of the total expenditures in agriculture production and more than 40% of the agricultural income (NPR 1,549,000, Table 6.3-2).

	Gaura (n=	idaha 87)	Gaur (n=	iganj 57)	Kan (n=	mal 35)	Shivas (n=1	atakshi 155)	To (n=3	tal 334)
Expenditure	(NPR '000 /Year)	(%)	(NPR '000 /Year)	(%)	(NPR '000 /Year)	(%)	(NPR '000 /Year)	(%)	(NPR '000 /Year)	(%)
Food	63.6	19.3	66.8	26.8	57.6	22.4	71.0	27.5	66.9	24.3
Clothing	20.6	6.3	19.8	7.9	14.0	5.4	17.9	6.9	18.5	6.7
Health/Medical	28.5	8.6	29.7	11.9	32.0	12.4	22.8	8.8	26.4	9.6
Education	51.6	15.7	35.2	14.1	35.2	13.7	33.9	13.1	38.9	14.1
Utilities	36.0	10.9	25.2	10.1	42.2	16.4	30.0	11.6	32.0	11.6
House Repair and Maintenance	0.4	0.1	0.5	0.2	0.3	0.1	0.3	0.1	0.3	0.1
Irrigation Service Fee of KIS	0.6	0.2	0.6	0.2	0.5	0.2	0.4	0.2	0.5	0.2
Electric Bill of Shallow Tube Well	5.7	1.8	2.3	0.9	2.8	1.1	0.8	0.3	2.5	0.9
Agriculture Production	77.7	23.6	50.4	20.2	56.6	22.0	56.6	21.9	61.0	22.2
Insurance	4.2	1.3	4.9	2.0	4.9	1.9	5.8	2.2	5.2	1.9
Interest Payment (Bank/Cooperative)	40.7	12.3	14.2	5.7	11.5	4.5	18.4	7.1	22.8	8.3
Total	329.6	100.0	249.6	100.0	257.6	100.0	257.9	100.0	275.0	100.0

Table 6.3-5	Averag	e Household E	xpenditure by	y Municipality

Source: JICA Project Team

Table 6.3-6 Differences between Income and Expenditures

	Average Income (1) (NPR Thousand/Year)	Average Expenditure (2) (NPR Thousand/Year)	Saving (1)-(2)/(1) (%)
Gauradaha (n=87)	537.7	329.6	39.9
Gauriganj (n=57)	356.8	249.6	30.0
Kamal (n=35)	440.7	257.6	42.3
Shivasatakshi (n=155)	337.3	257.9	23.9
Total (n=334)	403.7	275.0	31.9

Source: JICA Project Team

Table 6.3-7	Income Expenditu	re Tally

	More Expenditu	are than Income	Less Expenditure than Income			
	No	%	No	%		
Gauradaha (n=87)	36	41.4	51	58.6		
Gauriganj (n=57)	29	50.9	28	49.1		
Kamal (n=35)	11	31.4	24	68.6		
Shivasatakshi (n=155)	83	53.5	72	46.5		
Total (n=334)	159	47.6	175	52.4		

	Tuble ole o Solution for Income Shortuge									
	Gaura	adaha	Gauriganj		Kamal		Shivasatakshi		Total	
	(n=	(n=87) (n=57)		(n=35)		(n=155)		(n=334)		
	No	%	No	%	No	%	No	%	No	%
Borrowed from friends										
/neighbours /relatives	21	24.1	24	42.1	7	20.0	47	30.3	99	29.6
Credit from Bank	5	5.7	1	1.8	2	5.7	11	7.1	19	5.7
Credit from Cooperatives	26	29.9	6	10.5	2	5.7	24	15.5	58	17.4
Used saving	12	13.8	8	14.0	5	14.3	33	21.3	58	17.4

Table 6.3-8 Solution for Income Shortage

Note: Other reasons include From landlords, From women's group and Sales of land Source: JICA Project Team

	Gauradaha (n=87)		na Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Decreased	32	36.8	15	26.3	9	25.7	65	41.9	121	36.2
No change	55	63.2	42	73.7	26	74.3	90	58.1	213	63.8
Increased	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Table 6.3-9 COVID-19 Effect on Annual Income

Source: JICA Project Team

Table 6.3-10	Income Sour	ce Decrease	by CO'	VID-19 Effect

	Gaura	adaha	Gaur	Gauriganj		Kamal		Shivasatakshi		Total $(n-224)$	
	(n=	87)	(n=	:57) 	(n=	35)	(n=	=155)	(n=;	534) V	
	INO	%	INO	%	INO	%	INO	%	INO	%	
Farm income (Cereal Crops)	11	12.6	7	12.3	3	8.6	6	3.9	27	8.1	
Farm income (Oil Seeds)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Farm Income (Pulses)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Farm income (Vegetables)	0	0.0	0	0.0	0	0.0	9	5.8	9	2.7	
Farm income (Others such as											
livestock fishery and											
beekeeping)	0	0.0	0	0.0	0	0.0	8	5.2	8	2.4	
Overseas remittance	12	13.8	1	1.8	2	5.7	19	12.3	34	10.2	
Other incomes (specify)	8	9.2	7	12.3	4	11.4	25	16.1	44	13.2	

Note: other sources of incomes were Business, Daily Wage, Driving, Job, Priest, Retail shop, Real estate, Contractor, Teaching Source: JICA Project Team

6.3.2 Economic Ability to Access a Variety of Foods

The household dietary diversity score (HDDS) is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. It is said that an increase in dietary diversity is associated with socio-economic status and household food security (household energy availability)⁵. Based on standardized questionnaire of universal applicability from which various dietary diversity can be calculated adapting to the local context, the household dietary diversity (HDD) of the respondent HHs were assessed by asking them questions regarding what their family had eaten inside home during the previous day and at night questions, which meant over the last 24 hours. The HDD includes (a) foods prepared in the home and consumed in the home and (b) purchased or gathered outside and consumed in the home. However, it does not include foods purchased outside the home and consumed outside.

For the purpose of assessing HDD, the JICA Project Team included 12 food groups used universally. Later the respondent HHs in four municipalities were characterized into three groups: i) low diversity (eating food three or less food groups – cereals, vegetables and fruits), ii) medium diversity (eating four

⁵ The calculation method is referred from FAO-Guidelines-Dietary Diversity.

or five groups including cereals, vegetables and fruits) and iii) high diversity (eating six or more groups together with cereals, vegetables and fruits). The survey found 55.7% of the total HHs with high HDD score and 1.5% of the total HHs with low HDD (Table 6.3-11). This suggests that the economic ability of the HHs to access a variety of food is high with highest in Gauradaha, followed by, Kamal, Shivasatakshi and Gauriganj.

Household Dietary	Low D	iversity	Medium	Diversity	High Diversity				
Diversity Score $= 7.64$	No	%	No	%	No	%			
Gauradaha (n=87)	0	0.0	31	35.6	56	64.4			
Gauriganj (n=57)	2	3.5	27	47.4	28	49.1			
Kamal (n=35)	0	0.0	12	34.3	23	65.7			
Shivasatakshi (n=155)	3	1.9	73	47.1	79	51.0			
Total (n=334)	5	1.5	143	42.8	186	55.7			

 Table 6.3-11 Household Dietary Diversity by Municipality

Source: JICA Project Team

To assess the extent to which the HDD was affected by the COVID-19 pandemic, the respondent were asked to depict what they had eaten over one month in August 2019 (before the emergence of the COVID-19 pandemic) and August 2021 (during/after COVID -19). The study found no substantial differences in the average HDD for vegetarians and non-vegetarians before and after COVID-19, remaining between 10.65 and 10.59, and 20.94 and 20.90, respectively (Table 6.3-12). Hence, this baseline survey concludes that the economic ability of the respondent HHs has not been significantly affected by COVID-19. The key reasons include (a) geographical location of the municipalities with good access to two big market centres, Damak and Birtamod, in Jhapa district, (b) operation of several small local markets in these municipalities where the farmers could buy and sell their produces and daily necessity items, (c) regular delivery of water for irrigation by the KIMO and the WUA as per the schedules, and (d) personal STWs owned by the majority of farmers. Other reasons for sustaining economic activities during the COVID-19 situation are evident in discussions in the next livelihoods strategy and agricultural section.

Vaar	Average HDDS Score					
rear	Vegetarian	Non-vegetarian				
2019	10.65	20.94				
2021	10.59	20.90				

 Table 6.3-12 COVID-19 Effect on Household Dietary Diversity

6.3.3 Livelihood Strategy

Experience has shown that when livelihoods are negatively affected by a stress /crisis/emergency household may adopt various mechanisms which are not usually adopted in a normal day-to-day life so as to cope with reduced or declining access to food. In this baseline survey, the respondents were asked if anyone in their households had to engage in any of the nine coping strategies as specified in the table below because there was not enough food or money to buy food over the last one year period after COVID-19 emergence.

SN	Action/response/activity to respond to food shortage	Strategies							
1	Sell household assets/goods	Stress							
2	Purchase food on credit or borrowed food								
3	Spend savings								
4	Borrow money								
5	Sold productive assets such as (sewing machine, plough, ox, cart etc.)	Crisis							
6	Consumed seed stocks that were to be held/saved for the next season	Crisis							
7	Withdraw children from School	Crisis							
8	Sell house or land	Emergency							
9	Sell last female animals (female goat, female cow etc.)	Emergency							

Table 6.3-13 Questions Related to Livelihoods Strateg	y ⁶
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Source: JICA Project Team

As seen from the data presented below, 85% of the households did not need to adopt any coping strategies, with the highest proportion in Gauradaha (97.7%), followed by Kamal (94.3%), Gauriganj (80.7%) and Shivasatakshi (77.4%). Likewise, 13.5% HHs had to follow stress strategy; the economic ability of the people to engage in agriculture and other economic activities has not been generally affected. A very few in these four municipalities had to apply crisis (0.6%) and emergency strategies (0.9%). The percentage of HHs reporting to have applied emergency strategy was less than 1%, with one HH each in Gauradaha, Gauriganj, and Shivasatakshi. The percentage of HHs applying crisis and emergency strategies could be considered very small because the number of respondents in this survey was substantially high.

Overall, this survey concludes that the effect on household dietary diversity is almost none despite the people in four municipalities have suffered from the COVID-19 pandemic like all over Nepal and the globe.

	I upic ole				sea sj e		211000		
	No Copi	ng Strategy	St	tress	Cr	isis	Emer	Total	
	No	%	No	%	No	%	No	%	No
Gauradaha (n=87)	85	97.7	0	0.0	1	1.1	1	1.1	87
Gauriganj (n=57)	46	80.7	10	17.5	0	0.0	1	1.8	57
Kamal (n=35)	33	94.3	1	2.9	1	2.9	0	0.0	35
Shivasatakshi									
(n=155)	120	77.4	34	21.9	0	0.0	1	0.6	155
Total (n=334)	284	85.0	45	13.5	2	0.6	3	0.9	334

Table 6.3-14 Livelihood Change Caused by COVID-19 Effect

⁶ Generally, 10 strategies are used instead of nine. However, the JICA Project Team refrained from using 10th strategy,

[&]quot;Begging". The **Begging** (Prohibition) Act, 1962 prohibits Nepali people from **begging** or encouraging children who are under the age of 16 to **beg**. The **law** came into effect in 2018 Some respondents could be annoyed if asked about begging.

6.4 Water Management and Maintenance of Irrigation Facilities

6.4.1 Payment of Service Fee

The following table shows the respondent's behaviour toward irrigation service fee (ISF). 93.4% in FY 2020/2020 and 92.2% in FY 2019/2020 of respondent have answered that they have paid ISF. However, it is assumed that the paid amount of ISF are lower than the ISF as per irrigated area.

		Irrigation Service Fee (ISF) in 2020/21				Irrigation Service Fee (ISF) in 2019/20				
SCC No	Number of Respondent	Pa	id	Not	Paid	Pa	id	Not Paid		
		No	%	No	%	No	%	No	%	
SCC 0	15	15	100.0	0	0.0	15	100.0	0	0.0	
SCC 1	16	15	93.8	1	6.3	15	93.8	1	6.3	
Model TCC	10	9	90.0	1	10.0	9	90.0	1	10.0	
Others	6	6	100.0	0	0.0	6	100.0	0	0.0	
SCC 2	15	15	100.0	0	0.0	15	100.0	0	0.0	
SCC 3	15	15	100.0	0	0.0	15	100.0	0	0.0	
SCC 4	15	14	93.3	1	6.7	14	93.3	1	6.7	
SCC 5	15	9	60.0	6	40.0	9	60.0	6	40.0	
SCC 6	15	14	93.3	1	6.7	14	93.3	1	6.7	
SCC 7	15	15	100.0	0	0.0	15	100.0	0	0.0	
SCC 8	15	15	100.0	0	0.0	15	100.0	0	0.0	
SCC 9	15	14	93.3	1	6.7	13	86.7	2	13.3	
SCC 10	16	14	87.5	2	12.5	14	87.5	2	12.5	
Model TCC	10	8	80.0	2	20.0	8	80.0	2	20.0	
Others	6	6	100.0	0	0.0	6	100.0	0	0.0	
SCC 11	15	13	86.7	2	13.3	14	93.3	1	6.7	
SCC 12	15	9	60.0	6	40.0	9	60.0	6	40.0	
SCC 13	15	15	100.0	0	0.0	15	100.0	0	0.0	
SCC 14	14	13	92.9	1	7.1	13	92.9	1	7.1	
SCC 15	17	17	100.0	0	0.0	16	94.1	1	5.9	
Model TCC	10	10	100.0	0	0.0	9	90.0	1	10.0	
Others	7	7	100.0	0	0.0	7	100.0	0	0.0	
SCC 16	15	15	100.0	0	0.0	14	93.3	1	6.7	
SCC 17	16	16	100.0	0	0.0	16	100.0	0	0.0	
Model TCC	10	10	100.0	0	0.0	10	100.0	0	0.0	
Others	6	6	100.0	0	0.0	6	100.0	0	0.0	
SCC 18	15	14	93.3	1	6.7	15	100.0	0	0.0	
SCC 19	15	15	100.0	0	0.0	13	86.7	2	13.3	
SCC 20	15	15	100.0	0	0.0	14	93.3	1	6.7	
SCC 21	15	15	100.0	0	0.0	15	100.0	0	0.0	
Total	334	312	93.4	22	6.6	308	92.2	26	7.8	

Tabla 6 4 1	Dowmont	of Invigation	Samiaa	Foo by SCC	۲
1 able 0.4-1	1 ayment	of fifigation	Set vice	ree by SCC	~

The following table shows the reason that the respondent did not paid ISF. The highest answer is that the respondent could not receive the irrigation water from the canal (nine cases in FY 2019/2020, six cases in FY2020/2021). There was a case that ISF collector did not collect the ISF, one case in FY 2019/2020 and two cases in FY 2020/2021. There is no official list of ISF collector in WUA and the nomination of collector is depends on SCCs /TCCs /DTOCs so that the missing area of ISF collection could be happened. It is also assumed that some water users are not recognised by ISF collector.

FY2019/2020		FY2020/2021	
Reason	Number of respondents	Reason	Number of respondents
Lack of water in the canal	9	Lack of water in the canal	6
Rented land	5	Rented land	5
No one came to collect	2	No water in the canal when required	4
Due to Joint Family	1	Did not use the water in this year	1
Missed to pay	1	Due to Joint Family	1
No water in the canal when required	1	Missed to pay	1
Don't Know	8	No one came to collect	1
		Don't Know	2
Total	27	Total	21

Table 6.4-2The Reasons for Non-payment of ISF

Source: JICA Project Team

The following table show the payment of O&M fee. Since this fee is not mandatory specified in By-law, it is a voluntary activity conducted by TCC /DTOC. More than 80% of respondent from SCC 13, 14, 15, 16, 18, 19, 20, 21 have paid O&M fee. The average amount of O&M fee was around NPR 70 in FY 2019 /2020 and NPR 80 in FY 2020 /2021. It is noted that only SCC 0 and 10 collect fee for canal maintenance so there is necessity to find out what kind of activities are conducted based on the collected O&M fee.

	TT - 1	O & M Fee (ISF) in 2020/21					O & M Fee (ISF) in 2019/20				
SCC No	Total Number of	Pa	ud	Not	Paid	Pa	ud	No	ot Paid		
Sec No	Respondent	No	%	No	%	No	%	No	%		
SCC 0	15	15	100.0	0	0.0	15	100.0	0	0.0		
SCC 1	16	0	0.0	16	100.0	0	0.0	16	100.0		
Model TCC	10	0	0.0	10	100.0	0	0.0	10	100.0		
Others	6	0	0.0	6	100.0	0	0.0	6	100.0		
SCC 2	15	5	33.3	10	66.7	5	33.3	10	66.7		
SCC 3	15	0	0.0	15	100.0	0	0.0	15	100.0		
SCC 4	15	0	0.0	15	100.0	1	6.7	14	93.3		
SCC 5	15	2	13.3	13	86.7	2	13.3	13	86.7		
SCC 6	15	0	0.0	15	100.0	0	0.0	15	100.0		
SCC 7	15	0	0.0	15	100.0	0	0.0	15	100.0		
SCC 8	15	0	0.0	15	100.0	0	0.0	15	100.0		
SCC 9	15	0	0.0	15	100.0	0	0.0	15	100.0		
SCC 10	16	9	56.3	7	43.8	10	62.5	6	37.5		
Model TCC	10	5	50.0	5	50.0	6	60.0	4	40.0		
Others	6	4	66.7	2	33.3	4	66.7	2	33.3		
SCC 11	15	0	0.0	15	100.0	1	6.7	14	93.3		

Table 6.4-3Payment of O&M Fee in FY 2019/20 and 2020/21

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		0 &	M Fee (IS	SF) in 202	0/21	O & M Fee (ISF) in 2019/20					
SCC No	Total Number of	Pa	id	Not	Paid	Pa	id	No	ot Paid		
SCC NO	Respondent	No	%	No	%	No	%	No	%		
SCC 12	15	1	6.7	14	93.3	1	6.7	14	93.3		
SCC 13	15	12	80.0	3	20.0	12	80.0	3	20.0		
SCC 14	14	13	92.9	1	7.1	13	92.9	1	7.1		
SCC 15	17	16	94.1	1	5.9	13	76.5	4	23.5		
Model TCC	10	10	100.0	0	0.0	8	80.0	2	20.0		
Others	7	6	85.7	1	14.3	5	71.4	2	28.6		
SCC 16	15	13	86.7	2	13.3	12	80.0	3	20.0		
SCC 17	16	6	37.5	10	62.5	8	50.0	8	50.0		
Model TCC	10	4	40.0	6	60.0	5	50.0	5	50.0		
Others	6	2	33.3	4	66.7	3	50.0	3	50.0		
SCC 18	15	13	86.7	2	13.3	13	86.7	2	13.3		
SCC 19	15	15	100.0	0	0.0	13	86.7	2	13.3		
SCC 20	15	12	80.0	3	20.0	11	73.3	4	26.7		
SCC 21	15	15	100.0	0	0.0	15	100.0	0	0.0		
Total	334	147	44.0	187	56.0	145	43.4	189	56.6		

Source: JICA Project Team

6.4.2 Cropping Calendar and Water Distribution

Data presented in the table below shows the current situation of farmers who are preparing cropping calendar and water distribution plan. Almost all respondents (99.1%) have not prepared cropping calendar. Meanwhile, 79.9% of the respondents understand the necessity of water distribution plan and have utilised by the season. However, during the interview survey of SCC it is found there is no written documents describing the water distribution so there is some kind of internal water distribution system created in the 50-years irrigation under KIS.

 Table 6.4-4
 Preparation of Cropping Calendar and Water Distribution Plan

	Ye	s	No	0	
	Number of	Percentage	Number of	Percentage	
	Respondent	(%)	Respondent	(%)	
Have you prepared cropping calendar in advance					
and utilized last year?	3	0.9	331	99.1	
Do you know water distribution plan by seasons					
which should be prepared before the cultivation					
(irrigation schedule)?	267	79.9	67	20.1	
Have you prepared and utilized water distribution					
plan by seasons (irrigation schedule)?	219	65.6	115	34.4	

Source: JICA Project Team

6.4.3 Availability of Irrigation Water

The following figure shows the irrigated area by canal and shallow tube well (STW) and availability of irrigation water in FY 2020 /2021 spring season.

In FY 2020 /2021, SCC 0 and 13 to 22 is scheduled to get water under rotation system. Except for SCC 15, 19 and 20, more than 50% of respondent from the above SCC answered as "More than adequate" or "Adequate". In SCC 0 and 13 to 22, there are many respondents who uses shallow tube well (STW) in spring season in addition to the canal water. The highest area is SCC 20 (11.60 ha), followed by SCC

19 (6.13 ha), SCC 18 (3.93 ha). It is assumed that canal water did not reach at the area since they are located the end of reach V.

Besides, SCC 1 to SCC 12 should be non-irrigated area under rotation system. However, SCC 1 to 6 might take the irrigation water from canal even the year is not the period that they can receive the irritation water, answered as "Adequate" in SCC 2 (20.0%), 3 (20.0%), 4 (26.7%), 5 (33.3%). Especially, SCC 0, 1 and 2 are located in Reach I and the irrigation water goes through their cross regulator every spring season so that they can easily take water. Understandingly, there are many respondents who uses shallow tube well (STW) in spring season when they cannot get water from canal under rotation system.

		Status of Irrigation Water in Spring season								Inni	gotad		
	ant	Irri	gated		Status	or mis	gation v	valer	n sprng	g seaso	<u>11</u>	Area	a from
SCC No	tal nde	Are	a from	More	e than	Adeo	quate	N	ot	Not v	vater at	Shallo	w Tube
SCC NO	To	Kalik		auey	luate		1	auer	Juale		a11	V	/ell
	Re	No	Area	No	(%)	No	(%)	No	(%)	No	(%)	No	Area
SCC 0	15	14	(na)	0	0.0	11	72.2	1	67	2	20.0	1	(na)
SCC 1	15	14	2.27	0	0.0	12	75.0	1	0.7	3	20.0	2	0.13
Model TCC	10	8	2.07	0	0.0	0	75.0	0	0.0	- 4	25.0	0	0.20
Others	6	3	0.53	0		3		0		3		2	
SCC 2	15	4	0.55	0	0.0	3	20.0	0	0.0	12	80.0	1	0.07
SCC 3	15	7	1.07	0	0.0	3	20.0	0	0.0	12	80.0	2	0.74
SCC 4	15	5	0.63	0	0.0	4	26.7	0	0.0	11	73.3	0	0.74
SCC 5	15	6	1.67	0	0.0	5	33.3	1	6.7	9	60.0	2	0.60
SCC 6	15	7	3.97	0	0.0	1	6.7	0	0.0	14	93.3	5	3.23
SCC 7	15	9	3.93	0	0.0	0	0.0	1	6.7	14	93.3	7	3.70
SCC 8	15	4	1.07	0	0.0	0	0.0	0	0.0	15	100.0	2	1.23
SCC 9	15	10	5.17	0	0.0	0	0.0	1	6.7	14	93.3	10	5.17
SCC 10	16	14	10.27	0	0.0	0	0.0	4	25.0	12	75.0	14	10.27
Model TCC	10	9	7.97	0		0		4		6		9	
Others	6	5	2.30	0		0		0		6		5	
SCC 11	15	12	6.67	0	0.0	0	0.0	2	13.3	13	86.7	12	6.67
SCC 12	15	8	6.83	0	0.0	0	0.0	1	6.7	14	93.3	6	6.57
SCC 13	15	14	6.90	1	6.7	8	53.3	4	26.7	2	13.3	2	0.27
SCC 14	14	13	3.58	1	7.1	7	50.0	2	14.3	4	28.6	3	0.90
SCC 15	17	14	8.00	0	0.0	4	23.5	1	5.9	12	70.6	3	1.57
Model TCC	10	9	5.17	0		2		0		8	\langle	3	
Others	7	5	2.83	0		2		1		4		0	
SCC 16	15	15	8.93	0	0.0	9	60.0	2	13.3	4	26.7	3	0.83
SCC 17	16	16	9.40	1	6.3	7	43.8	2	12.5	6	37.5	7	3.12
Model TCC	10	10	5.57	1		7		1		1		4	
Others	6	6	3.83	0		0		1		5		3	
SCC 18	15	15	7.57	1	6.7	8	53.3	4	26.7	2	13.3	6	3.93
SCC 19	15	13	8.57	0	0.0	2	13.3	2	13.3	11	73.3	9	6.13
SCC 20	15	15	15.67	0	0.0	6	40.0	5	33.3	4	26.7	8	11.60
SCC 21	15	13	12.73	0	0.0	9	60.0	1	6.7	5	33.3	4	3.57
Total	334	239	128.12	4	1.2	99	29.6	34	10.2	197	59.0	109	70.49

Table 6.4-5Status of Irrigated Area by Canal and STW and Water Availability in FY2020/2021 Spring Season

Note: White shaded area is scheduled to receive irrigation water in spring season,. Deep-grey shaded is the area not to receive irrigation water in spring season under rotation system.

The following figure shows the irrigated area by canal and shallow tube well (STW) and availability of irrigation water in FY 2020 /2021 winter season. There is no rotation system in winter season so all farmers has a full chance to receive the irrigation water.

In total, 312 farmers (93.4% of total respondents) irrigated their land by canal water. Out of 312 farmers, 237 farmers (76.0%) felt the provision of canal water is "Not adequate" or "Not water at all". It is said that the available water in winter season is more than spring season, and the number of farmers get irrigated (312 farmers) is more than winter season (239 farmers, Table 6.4-5). However, the irrigated area from canal (98.36 ha) is less than spring season (128.18 ha, Table 6.4-5).

The percentage of "More than adequate" and "Adequate" is the highest in SCC 0 (73.3%), followed by SCC 1 (68.6%), SCC 4 (53.3%). It shows a tendency that SCC located upstream of main canal are satisfied in the water distribution. Meanwhile, there is a differences of the water availability in the same SCC. It shows the land located in the head of SCC can receive the canal water but the land at the tail of KIS is difficult to receive the canal water.

		Irrigated Status of Irrigation Water in Winter season								Irrigated			
SCC No	lotal ponden	Area Kar	from nkai nal	More adec	e than Juate	Ade	quate	N adec	ot juate	Not w	vater at all	Area Sha Tube	llow Well
	7 Resj	No	Area (ha)	No	(%)	No	(%)	No	(%)	No	(%)	No	Area (ha)
SCC 0	15	15	4.98	0	0.0	11	73.3	1	6.7	3	20.0	1	0.23
SCC 1	16	15	3.59	0	0.0	11	68.8	2	12.5	3	18.8	2	0.57
Model TCC	10	9	1.85	0		9		0		1		0	
Others	6	6	1.74	0		2		2		2		2	
SCC 2	15	15	4.57	0	0.0	0	0.0	1	6.7	14	93.3	10	4.42
SCC 3	15	15	3.54	0	0.0	6	40.0	0	0.0	9	60.0	7	1.78
SCC 4	15	14	2.67	0	0.0	8	53.3	0	0.0	7	46.7	5	0.61
SCC 5	15	12	1.70	0	0.0	7	46.7	3	20.0	5	33.3	4	0.33
SCC 6	15	14	6.78	0	0.0	2	13.3	1	6.7	12	80.0	11	3.73
SCC 7	15	12	3.35	0	0.0	0	0.0	2	13.3	13	86.7	8	1.48
SCC 8	15	13	2.88	0	0.0	2	13.3	3	20.0	10	66.7	6	1.47
SCC 9	15	15	4.59	0	0.0	2	13.3	7	46.7	6	40.0	9	2.40
SCC 10	16	15	5.32	0	0.0	1	6.3	6	37.5	9	56.3	12	4.47
Model TCC	10	9	3.27	0		0		3		7		9	
Others	6	6	2.06	0		1		3		2		3	
SCC 11	15	11	2.74	2	13.3	1	6.7	2	13.3	10	66.7	7	2.92
SCC 12	15	13	4.48	0	0.0	1	6.7	9	60.0	5	33.3	8	2.65
SCC 13	15	15	3.12	0	0.0	5	33.3	0	0.0	10	66.7	7	1.22
SCC 14	14	14	4.44	2	14.3	4	28.6	0	0.0	8	57.1	6	1.20
SCC 15	17	17	5.57	0	0.0	0	0.0	0	0.0	17	100.0	10	2.66
Model TCC	10	10	3.61	0	\bigcirc	0		0		10		5	\bigcirc
Others	7	7	1.96	0		0		0		7		5	
SCC 16	15	14	3.76	0	0.0	3	20.0	3	20.0	9	60.0	9	1.58
SCC 17	16	16	9.15	0	0.0	3	18.8	0	0.0	13	81.3	10	3.25
Model TCC	10	10	4.67	0		3		0		7		7	\bigcirc
Others	6	6	4.48	0		0		0		6		3	
SCC 18	15	15	5.67	0	0.0	0	0.0	3	20.0	12	80.0	15	3.63

Table 6.4-6Status of Irrigated Area by Canal and STW and Water Availability in FY
2020/2021 Winter Season

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		Irrig	gated		Status	of Irrig	gation V	Vater in	Winter	season		Irrigated	
SCC No	Total spondent	Area from Kankai Canal		More than adequate		Adequate		Not adequate		Not water at all		Area from Shallow Tube Well	
	Re	No	Area (ha)	No	(%)	No	(%)	No	(%)	No	(%)	No	Area (ha)
SCC 19	15	15	7.17	0	0.0	0	0.0	0	0.0	15	100.0	12	5.82
SCC 20	15	13	5.56	0	0.0	2	13.3	1	6.7	12	80.0	9	4.50
SCC 21	15	14	2.74	0	0.0	2	13.3	1	6.7	12	80.0	10	2.53
Total	334	312	98.36	4	1.2	71	21.3	45	13.5	214	64.1	178	53.47

Source: JICA Project Team

The following figure shows the irrigated area by canal and shallow tube well (STW) and availability of irrigation water in FY 2020/2021 rainy season. In total, all respondent irrigated their land by canal water. Out of all respondents, 76.7% of the respondent felt the availability of canal water as "Adequate" or "More than adequate", whereas 18.0% felt "Not water at all" and 5.4% felt "Not adequate". Out of total respondents, 21.9% of the respondent used STW, which covered 16.0% of total land.

The SCCs developed in phase 2 and the tail end of Phase1 are has high proportion in "Not water at all" and "Not adequate" (the tail end of Phase1: SCC 11 and 12, Phase 2: SCC 13 to 21). Whereas there is a differences of the water availability in the respondents from the same SCC of phase 2 (e.g., In SCC 19, 46.7% of respondent felt "Adequate" or "More than adequate" but 53.3% answered as "Not water at all" and "Not adequate"). In Phase 2 area, the development of tertiary canal is not completed so that water distribution could not be well operated and they used STW to cover the water shortage.

Table 6.4-7Status of Irrigated Area by Canal and STW and Water Availability in Rainy
Season in FY 2020/2021

		Irri	gated		Status	of Irrig	gation V	Vater in	Rainy s	season		Irrigated		
SCC No	Total spondent	Area Ka Ca	a from inkai anal	More than adequate		Adequate		Not adequate		Not water at all		Area from Shallow Tube Well		
	Re	No	Area (ha)	No	(%)	No	(%)	No	(%)	No	(%)	No	Area (ha)	
SCC 0	15	15	7.80	0	0.0	14	93.3	0	0.0	1	6.7	0	0.00	
SCC 1	16	16	11.28	0	0.0	16	100. 0	0	0.0	0	0.0	0	0.00	
Model TCC	10	10	6.21	0		10		0		0		0		
Others	6	6	5.07	0		6		0		0		0		
SCC 2	15	15	13.30	0	0.0	12	80.0	2	13.3	1	6.7	0	0.00	
SCC 3	15	15	10.10	0	0.0	14	93.3	1	6.7	0	0.0	1	0.30	
SCC 4	15	15	10.67	2	13.3	12	80.0	1	6.7	0	0.0	0	0.00	
SCC 5	15	15	10.27	0	0.0	10	66.7	4	26.7	1	6.7	2	0.73	
SCC 6	15	14	16.96	3	20.0	9	60.0	1	6.7	2	13.3	4	2.66	
SCC 7	15	15	16.87	0	0.0	12	80.0	3	20.0	0	0.0	3	1.93	
SCC 8	15	15	16.67	1	6.7	14	93.3	0	0.0	0	0.0	2	1.27	
SCC 9	15	15	14.60	9	60.0	5	33.3	0	0.0	1	6.7	2	0.80	
SCC 10	16	16	18.97	5	31.3	11	68.8	0	0.0	0	0.0	1	1.17	
Model TCC	10	10	13.60	1	\langle	9		0		0		1	\bigcirc	
Others	6	6	5.37	4		2		0		0		0		
SCC 11	15	15	23.90	7	46.7	1	6.7	1	6.7	6	40.0	4	2.57	
SCC 12	15	15	27.67	0	0.0	11	73.3	0	0.0	4	26.7	4	5.70	
SCC 13	15	15	8.15	3	20.0	8	53.3	0	0.0	4	26.7	2	0.37	
SCC 14	14	14	10.67	2	14.3	10	71.4	0	0.0	2	14.3	5	2.87	

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		Irri	gated		Status	of Irrig	gation V	Vater in	Rainy s	season		Irri	gated
SCC No	Total spondent	Area Ka Ca	a from inkai anal	More adeq	e than Juate	Adeo	quate	N adeq	ot juate	Not w a	ater at ll	Area Sha Tub	a from allow e Well
	Re	No	Area (ha)	No	(%)	No	(%)	No	(%)	No	(%)	No	Area (ha)
SCC 15	17	17	20.33	1	5.9	5	29.4	1	5.9	10	58.8	3	3.17
Model TCC	10	10	12.20	1		1		1		7		2	
Others	7	7	8.13	0		4		0		3		1	
SCC 16	15	15	23.30	1	6.7	10	66.7	0	0.0	4	26.7	9	4.87
SCC 17	16	16	21.40	2	12.5	7	43.8	1	6.3	6	37.5	6	4.17
Model TCC	10	10	11.63	2		5		1		2		5	
Others	6	6	9.77	0		2		0		4		1	
SCC 18	15	15	28.94	3	20.0	9	60.0	1	6.7	2	13.3	2	3.60
SCC 19	15	15	17.63	2	13.3	5	33.3	0	0.0	8	53.3	11	11.73
SCC 20	15	15	32.47	4	26.7	7	46.7	1	6.7	3	20.0	4	10.23
SCC 21	15	15	33.17	1	6.7	8	53.3	1	6.7	5	33.3	8	4.77
Total	334	334	395.1	46	13.8	210	62.9	18	5.4	60	18.0	73	62.89

Source: JICA Project Team

6.4.4 Facility Maintenance Plan

The following figure shows whether the respondents know facility maintenance plan prepared by their SCC/TCC. In total, 44% of the respondents answered they know the plan to maintain their irrigation facilities. However, under the baseline survey of SCC (Chapter 5), SCCs/TCCs/DTOCs does not prepare the written document which indicates the plan of facility maintenance (e.g., number and type of facilities, location and current condition, maintenance schedule, cost). They might have some kind of internal recognition shared by SCC/TCC (e.g., which facilities are urgently require the rehabilitation).

SCC No	Total Number of	Kn	ow	Don't Know		
SCC NO	Respondent	No	%	No	%	
SCC 0	15	15	100.0	0	0.0	
SCC 1	16	16	100.0	0	0.0	
Model TCC	10	10	100.0	0	0.0	
Others	6	6	100.0	0	0.0	
SCC 2	15	15	100.0	0	0.0	
SCC 3	15	15	100.0	0	0.0	
SCC 4	15	9	60.0	6	40.0	
SCC 5	15	0	0.0	15	100.0	
SCC 6	15	0	0.0	15	100.0	
SCC 7	15	7	46.7	8	53.3	
SCC 8	15	0	0.0	15	100.0	
SCC 9	15	7	46.7	8	53.3	
SCC 10	16	8	50.0	8	50.0	
Model TCC	10	3	30.0	7	70.0	
Others	6	5	83.3	1	16.7	
SCC 11	15	2	13.3	13	86.7	
SCC 12	15	4	26.7	11	73.3	
SCC 13	15	8	53.3	7	46.7	
SCC 14	14	10	71.4	4	28.6	
SCC 15	17	8	47.1	9	52.9	

 Table 6.4-8
 Preparation of Facility Maintenance Plan

Technical Cooperation Project for the Promotion of Irrigated Agriculture in Terai Plain Baseline Survey Report

SCC No	Total Number of	Kn	ow	Don't Know		
SCCINO	Respondent	No	%	No	%	
Model TCC	10	3	30.0	7	70.0	
Others	7	5	71.4	2	28.6	
SCC 16	15	5	33.3	10	66.7	
SCC 17	16	0	0.0	16	100.0	
Model TCC	10	0	0.0	10	100.0	
Others	6	0	0.0	6	100.0	
SCC 18	15	5	33.3	10	66.7	
SCC 19	15	3	20.0	12	80.0	
SCC 20	15	7	46.7	8	53.3	
SCC 21	15	3	20.0	12	80.0	
Total	334	147	44.0	187	56.0	

Source: JICA Project Team

6.4.5 COVID 19 Effect on Participation in Operation and Maintenance of Irrigation Facilities

The response by all the 334 respondents were "No". That means they have not reduced the participation in O&M activities in FY 2020/21 due to COVID-19 Pandemic.

6.5 Agriculture Production

During the individual farmer baseline survey, JICA Project Team the farmers about their cultivation practices, cultivation area under the different crops, total production in the season, major varieties, cultivation period, quantity sold and sale price by crop, in three cropping seasons, 2021 spring (February to May), 2020/2021 winter (October to January) and 2020 rainy season (June to September 2021)⁷. Whereas the respondents were also asked if they had changed or made to change any cultivation practices because of COVID 19 pandemic in the surveyed areas.

6.5.1 Production of Crops and Vegetables

Based on the survey, the dominating crop in KIS were found as rice in rainy and spring season and, as maize in spring and winter season and, as wheat, buckwheat and mustard in winter season. The cropping pattern of these products are shown below.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
D.								R	ainy			
Rice				Spring	1							
Maiza			1	Spring								
Maize	ize Winter											Winter
Wheat	Win	nter										Winter
Buckwheat/ Mustard	Winter	. /										Winter

Source: JICA Project Team

Figure 6.5-1 The dominating cropping pattern in KIS

Table 6.6-1, Table 6.6-2 and Table 6.6-3 below shows the percentage of agricultural land covered by 2021 spring season, 2020 /2021 winter season, and 2020 rainy season respectively.

⁷ Nepali months of these three seasons do not tally exactly with the English months. However, tentatively these months match with the seasons. From the cultivation practices, the three

2021 Spring Season. As seen from the following table, in spring season, 57.2% of the total surveyed HHs cultivated spring rice in four municipalities but the area under the spring rice was less than one third (27.4%) of the total agricultural land with 59.7 ha with average of 0.18 ha per HH, and area and number of HHs growing other spring season crops was limited. The proportion of HHs farming high value vegetable crops and pulses was extremely low despite of access to KIS and STW irrigation reveal the urgency to promote market oriented agriculture. The rice was followed by maize, pulses and vegetables. This suggests that the cropping system in KIS area is predominantly cereal-based.

The most widely adopted rice variety in the spring season is BG1442 which was released by Nepal Agriculture Research Council (NARC) in 2004 as Hardinath-1 though many farmers still called it just BG or BG 42. Other varieties are Chaite 2 and Chaite 6, but difficult to identify since farmers called just Chaite Dhan. Interestingly, none of the surveyed farmers reported growing Chaite 5 rice released by NARC just four years ago for Terai and inner Terai areas up to 700 metre above the sea level. and river bed. This suggests a slow process and delay in reaching new varieties released by the NARC to the farmers. However, the average yield of spring season rice, whose growing season is usually 120 days from the day of seeding in the nursery beds (usually from the second week of February) to the harvesting time (second to the third week of June,)was found satisfactory (4.69 Mt/ha). The average reported yield seems slightly higher than the average potential yield.

Nevertheless, low coverage of spring rice in irrigated and potential KIS command areas reveals that many farmers have been shifting to other spring crops, specifically spring maize which can also be harvested within 100 to 120 days (+, - 3 to 5 days) depending on the time of sowing and varieties grown, since it fits rice-mustard-maize cropping pattern. Many hybrid rice varieties are imported to Nepal from India formally and informally through cross-border mechanisms. However, it is also found that farmers prefer Nepali open varieties if available or use their seeds.

	Rice			Maize		Pulses			Vegetables			
Municipality	Coverage Area (%)	Household (%)	Yield (MT/ha)	Coverage Area (%)	Household (%)	Yield (MT/ha)	Coverage Area (%)	Household (%)	Yield (MT/ha)	Coverage Area (%)	Household (%)	Yield (MT/ha)
Gauradaha			4.40	0.1		9 (0)			0.04			
(n=87)	35.4	94.3	4.48	0.1	1.1	3.60	0.2	1.1	0.36	NA	NA	NA
Gauriganj	27.1	50.6	5.00	2.0	14.0	2.42	0.0	1.0	0.12	0.22	1.0	650
(n=57)	27.1	39.0	5.00	2.0	14.0	2.42	0.0	1.8	0.12	0.23	1.8	0.30
Kamal												
(n=35)	34.7	88.6	5.08	0.0	0.0	0.00	0.1	2.9	1.63	NA	NA	NA
Shivasatakshi												
(n=155)	15.0	28.4	4.63	15.0	24.5	4.63	0.8	1.9	0.18	0.13	1.9	4.29
Total	27.4	57.2	4.69	4.6	14.1	3.16	0.4	1.8	0.23	0.1	1.2	5.49

 Table 6.5-1
 Crops Grown in Spring Season by Municipality

Source: JICA Project Team

2020/2021 Winter Season. In the KIS area, the winter cropping season is more diverse. The following table shows that at least six crops are grown in the KIS area, dominated by two crops, maize and mustard. Yet, none of the six crops exceeded 10% of the total cultivated area with the highest in maize (9.7%), followed by mustard (7.2%), potato (6.79%), vegetables (3.6%), wheat (3%) and buckwheat (1.8%). However, in terms of number of households engaged by crops, the trend slightly changed with the highest proportion in maize (66.2%), followed by potato (57.5%), mustard (51.8%), buckwheat (16.2%),

vegetables (8.4%) and wheat (5.4%). The data showed the cropping intensity in the winter is less than 25%. The respondents provide several reasons for keeping most of the land fallow during the winter season:

- i) After the harvest of rainy season rice, the land still remains wet to take time making the land ready for the winter crops,
- ii) Many farmers spread rice crops in the field after the harvest to wait for threshing and wait till the price of rice increases,
- iii) Most winter crops, except for maize and vegetables, are not profitable but these crops are labour intensive while the area has always labour shortage,
- iv) Farmers can't compete with cheap vegetables entered form bordering cities/villages of India, so vegetables growing for market could end in net loss,
- v) Before the Corona period, many Indian citizens living in bordering cities used to rent land to grow maize bringing all inputs from India, and sell the produce in Nepal, and
- vi) Distribution of irrigation water in spring by KIMO/WUA is not regular since alternate rotation system is applied. So, the farmers having personal STW may grow some crops partially but not in the total land.

	Maize				Mustard			Potato		
Municipality	Coverag e Area (%)	House hold (%)	Yield (MT/ha)	Covera ge Area (%)	Househ old (%)	Yield (MT/ha)	Coverage Area (%)	Househ old (%)	Yield (MT/ha)	
Gauradaha (n=87)	7.8	73.6	3.28	6.4	56.3	0.69	2.1	50.6	7.69	
Gauriganj (n=57)	6.1	40.4	7.06	4.1	36.8	0.56	1.0	38.6	5.17	
Kamal (n=35)	10.7	80.0	3.98	9.4	65.7	0.68	0.6	62.9	8.75	
Shivasatakshi (n=155)	14.1	68.4	4.52	9.6	51.6	0.76	3.0	67.1	8.36	
Total	9.7	66.2	4.41	7.2	51.8	0.70	6.8	57.5	7.71	
	,	Vegetable	s		Wheat]	Buckwheat		
Municipality	Coverag e Area (%)	Vegetable House hold (%)	s Yield (MT/ha)	Covera ge Area (%)	Wheat Househ old (%)	Yield (MT/ha)	Coverage Area (%)	Buckwheat Househ old (%)	Yield (MT/ha)	
Municipality Gauradaha (n=87)	Coverag e Area (%) NA	Vegetable House hold (%) NA	s Yield (MT/ha) NA	Covera ge Area (%) 1.07	Wheat Househ old (%) 6.9	Yield (MT/ha) 1.79	Coverage Area (%) 2.4	Buckwheat Househ old (%) 20.9	Yield (MT/ha) 1.20	
Municipality Gauradaha (n=87) Gauriganj (n=57)	Coverag e Area (%) NA 0.3	Vegetable House hold (%) NA 0.5	s Yield (MT/ha) NA 7.95	Covera ge Area (%) 1.07 1.20	Wheat Househ old (%) 6.9 14.0	Yield (MT/ha) 1.79 2.76	Coverage Area (%) 2.4 1.5	Buckwheat Househ old (%) 20.9 17.5	Yield (MT/ha) 1.20 1.15	
Municipality Gauradaha (n=87) Gauriganj (n=57) Kamal (n=35)	Coverag e Area (%) NA 0.3 NA	Vegetable House hold (%) NA 0.5 NA	s Yield (MT/ha) NA 7.95 NA	Covera ge Area (%) 1.07 1.20 0.33	Wheat Househ old (%) 6.9 14.0 2.9	Yield (MT/ha) 1.79 2.76 1.50	1 Coverage Area (%) 2.4 1.5 3.2	Buckwheat Househ old (%) 20.9 17.5 25.7	Yield (MT/ha) 1.20 1.15 1.42	
Municipality Gauradaha (n=87) Gauriganj (n=57) Kamal (n=35) Shivasatakshi (n=155)	Coverag e Area (%) NA 0.3 NA 3.3	Vegetable House hold (%) NA 0.5 NA 16.1	s Yield (MT/ha) NA 7.95 NA 13.28	Covera ge Area (%) 1.07 1.20 0.33 0.40	Wheat Househ old (%) 6.9 14.0 2.9 1.9	Yield (MT/ha) 1.79 2.76 1.50 2.15	1 Coverage Area (%) 2.4 1.5 3.2 1.0	Buckwheat Househ old (%) 20.9 17.5 25.7 5.8	Yield (MT/ha) 1.20 1.15 1.42 1.03	

 Table 6.5-2
 Crops Grown in Winter Season by Municipality

Source: JICA Project Team

2021 Rainy Season. The sole crop grown by farmers during the rainy season is rice. The following table shows that all farmers (99.7%) reported growing of rice crops during the rainy season. The area covered was 92.6% of the agriculture land. However, no land is found as fallow. Remaining 8% land may not be fallow but used for other purposes such as fishery, livestock keeping, poultry, mushroom farming etc. Either land owners grow rice themselves or provide others under crop sharing arrangement. Average yield reported by farmers (4.08 MT/ha) corresponded to the district average and more than the national average (3.8 Mt/ha) by almost 7% higher. According to the survey results, farmers grow several rice varieties during the winter season, from local fine rice to medium and course high yielding rice, which could be hybrid (imported from India) and open-pollinated varieties. Rice varieties with 120-160

days of maturity are grown depending on the land type and the prevailing cropping system. The most popular rice varieties in the KIS area are Ranjit, Ram Dhan, Radha 12, Swarna Sub-1, Sawa Masuli Sab-1. Of these varieties, the most popular and dominating varieties are Ranjit and Sona Mansuli which is Indian varieties. These varieties were registered a few years ago by the National Seeds Board of Nepal/GoN but used by farmers even before the government registration. Given the high demand for these varieties, the GoN registered these varieties, but seed traders are supposed to indicate in the seed bags that the variety is susceptible to blast disease in Nepal. Swarna Sub-1, a sub-emergence tolerant variety released by NARC in 2011, is also increasing because it is medium-fine rice, and the potential yield is 4 to 5 Mt per ha. But it is a long-duration variety taking at least 150 days for maturity. The potential yield of these rice varieties comes to around 5.0 Mt per ha. This means that there is still a high potentiality to increase the productivity of rice in the KIS area by more than 20%.

It is also found that most of the respondents did not grow a sole or single rice variety. One of the key reasons for farmers to grow multiple varieties is to avoid risks of crop failure for reasons such as drought, heavy rains, diseases and pest damages.

Demands for the hybrid rice varieties are increasing. Most popular hybrid rice varieties are Arizee 6444 Gold and Arzee Idea Hybrids. These are early varieties taking 120 to 130 days, and so allow farmers to grow other winter crops safely, apart from 8 to 9 Mt per ha.

			Rice						
Municipality	Number of Total Respondent	Total Agricultural Land (ha)	Number of Respondent	Cultivated Area (ha)	Coverage (%)	Household (%)	Yield (MT/ha)		
Gauradaha	87	165.1	87	149.1	90.3	100	3.78		
Gauriganj	57	88.5	57	85.2	96.3	100	4.04		
Kamal	35	43.5	35	38.8	89.3	100	4.22		
Shivasatakshi	155	129.8	154	122.0	94.0	99.4	4.44		
Total	334	426.9	333	395.1	92.6	99.70	4.08		

 Table 6.5-3
 Crops Grown in Rainy Season by Municipality

Source: JICA Project Team

Finally, based on the cultivated area under the three different seasons and the total cultivated land, the cropping intensity in the KIS area is estimated at 148.6%, as shown in the table below.

 Table 6.5-4
 Cropping Intensity by Municipality

					v			
	Total Agricultural Land (ha)		Cultivated Area (na)					
Municipality		Spring	Winter	Rainy	Total	Cropping Intensity (%)		
Gauradaha	165.1	59.7	32.9	149.07	241.67	146.4		
Gauriganj	88.5	26.9	13.9	85.23	126.10	142.4		
Kamal	43.5	15.2	11.1	38.84	65.13	149.7		
Shivasatakshi	129.8	41.3	40.4	121.97	203.63	156.8		
Total	426.9	141.1	98.36	395.11	634.56	148.6		

6.5.2 Sales of Crops and Vegetables

The following table shows the percentage of producers selling different agricultural produces and the percentage of produces sold by them in three cropping seasons. The data reveals that most of the farmers in the KIS area carry out a mixed approach; neither are they engaged in "Grow and Sale" nor in "Grow to Sale" practice. More than 80% of households producing rice in rainy and spring seasons reported that they had sold more than 80% of their produce. This is indicative of their orientation to markets. However, in the case of other crops, the survey results show farmers' loosely connected to the markets which applies to even commercial crops like maize. Many farmers in KIS area are engaged in hybrid maize production. The hybrid varieties include PPS 4111, DKC 9081, All Rounder, 900 M Gold, TX 369 and so forth. However, the data reveal that 18.6% HHs sold their winter maize in the markets and 15.8%.of the produce sold to markets. The corresponding figures for spring maize was 14.9% and 12.4%, respectively. Likewise, the corresponding figures for vegetable was 75.0% and 69.7% in spring and 82.1% and 80.8% in winter. It reveals that vegetables are generally produced for sale. However, Table 6.5-1 and Table 6.5-2 show that the proportion of the households engaged in vegetable production was 1.2% in spring and 8.4% in winter with the very limited cultivated land, 0.1% in spring and 3.6% in the spring, respectively.

This further confirms that agriculture contributes to the household dietary diversity but not currently a major source of income for the farmers in the KIS area though there are multiple opportunities prevalent in the area. The following are supposed as key opportunities of this area but not limited to:

- i) Easy access to water through Kankai Irrigation Scheme,
- ii) A large number of personal STW owned by most of the farmers,
- iii) Area located between two major markets, Birtamod publicly managed fruit and vegetable market, and Damak privately managed fruit and vegetable market,
- iv) Most of the settlements and villages having black topped all weather road,
- v) The area connected with the east-west high way (Postal Highway is about to complete),
- vi) Of the four municipalities, Gauriganj borders with India and the other three are bordered by Gauriganj, and
- vii) A high access to public and private technology service providers.

Crop	Season	Household se	lling Product	The Sold Amount in Total Production	
		No	(%)	(%)	
Rice (n=192)	Spring	165	86.4	80.4	
Maize (n=47)	Spring	7	14.9	12.4	
Vegetables (n=4)	Spring	3	75.0	69.7	
Maize (n=221)	Winter	41	18.6	15.8	
Mustard (n=173)	Winter	4	2.3	2.8	
Vegetables (n=36)	Winter	23	82.1	80.8	
Rice (n=333)	Rainy	283	85.0	52.5	

 Table 6.5-5
 Household selling Product and Sold Product by Season

Source: JICA Project Team

Data presented in Table 6.5-6, Table 6.5-7 and Table 6.5-8 show the number of HHs and average, minimum and maximum sale prices of different crops grown in KIS area. The difference between minimum and maximum prices for vegetables were more than double in spring season, and this difference was remarkably high (minimum is NPR 5.00 per kg and maximum is NPR 105 per kg) in winter season. It suggests that the respondents could increase their income substantially if they are

capable to adjust sowing season of different vegetable varieties, and are well informed of the market prices, appropriately skilled in marketing techniques and knowledgeable to market specialities. Likewise, differences between the minimum, maximum and average rice prices of rainy season reported by respondent HHs were also remarkable, suggesting that farmers could substantially increase their income if they could select appropriate varieties and sell the produces when the price is high. Increasing productivity and production is the necessary aspect for increasing income but cannot gain the profit without marketing.

Table 6.	Table 6.5-6 Sales of Crops and Vegetable in Spring Season						
Crome	Number of	Sales Price (NPR/kg)					
Crops	Households selling	Average	Min	Max			
Rice	165	14.5	10.0	21.3			
Maize	7	24.4	20.0	25.0			
Vegetables	3	26.0	20.0	40.0			
Potato	1	40.0	40.0	40.0			

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Source: JICA Project Team

Table 6.5-7 Sales of Crops and Vegetable in Winter Season

		U				
Crons	Number of	Sales Price (NPR/kg)				
Crops	Respondent	Average	Min	Max		
Buckwheat	15	38.2	20.0	50.0		
Maize	41	23.4	15.0	100.0		
Pulses	4	97.5	30.0	200.0		
Vegetables	23	19.8	5.0	101.0		
Wheat	2	25.3	25.0	25.5		

Source: JICA Project Team

Table 6 5-8	Sales of Crops	and Vegetable in	Rainy Season
1 able 0.3-0	Sales of Crops a	and vegetable m	Kally Season

	Crome	Number of	Sales Pric	e (NPR/k	g)				
	Crops	Respondent	Average	Min	Max				
	Rice	283	25.9	12.5	75.0				
Source: JI	ource: JICA Project Team								

6.5.3 **Agricultural Inputs**

As shown in the Table 6.5-9, the respondent were asked whether they have used purchased seeds, water for irrigation, chemical fertilizers, organic manure, pesticides, and fungicides by seasons and crops. Data in the following table shows that more than two-third of respondent households (68.8%) purchased rice seeds in the spring season but only nearly one-third (37.3%) purchased seeds in the rainy season. Likewise, farmers would irrigate for all the crops from both of canals and STWs.

Fertilizer is also crucial inputs, used by more than 95% of the respondent, no matter what amount they could use due to the perpetual shortages of chemical fertilizers during the key cropping seasons. Most of the respondents stated that they would either travel to the bordering cities of India to buy fertilizers bearing the risks of seizures or captures by the Indian Border Security Police and Nepali police or buy from local traders at high prices. The local traders often import fertilizers through informal cross-border mechanisms. During the survey, most of the respondents said that it is impossible to get the desirable production without the use of fertilizer is not possible. Yet many farmers are not aware that the correct use of fertilizer would result high production when they would adopt 4R principles, which is fertilizer use-right source, right quantity, right time, and right placement, shortly called best management practices (BMP).

According to the surveyed farmers, one of the key reasons to leave agricultural land fallow during the spring and winter is the lack of labour. The shortage of fertilizers and water has further aggravated this. A large majority of the respondent households hired labour from outside to produce different crops with the highest 98.4% in spring rice, followed by 95.0%, and 80.1% in rainy season rice, and winter season maize respectively. The proportions of households using labour hired from outside were 75.5%, 66.7%, 58.3% in spring maize, spring vegetables, and winter vegetables. However, the proportion of HHs using hired labour is relatively lower in vegetable crops is due to the small proportion of land used in vegetable cultivation. Labour shortage during the key cropping seasons was one of the major issues raised by most respondents.

The data show that a large majority of respondent households have been using organic manures with the highest proportion in spring vegetables (100%), followed by winter vegetables (97.2%), spring maize (96.2%), and winter maize (89.8%). Not just because the shortages of chemical fertilizer have made Nepali farmers use organic manures, but it is a traditional practice for Nepalese farmers to combine organic manure with chemical fertilizers. However, organic manure should not be understood as a replacement for chemical fertilizers. Farmers have been using chemical fertilizers and organic manures to supply plant nutrients, unless they are engaged in organic production, and that chemical fertilizer was not available in the market during the land preparation and top-dressing period.

The proportion of respondent HHs depicting pesticides and fungicides use was low because the use is subject to the infestations, availability of the pesticides/fungicides in the markets, and the extent of infestations. Nepalese farmers are generally reluctant to use fungicides. However, a high proportion of HHs use pesticides with 88.9% for winter vegetables, followed by 88.7% and 79.2% for winter maize and spring maize, respectively. It reveals that these crops are very susceptible to several types of pests, which could be due to the use of hybrid seeds, depletion of soil nutrients and effect of climate change. The low proportion of HHs reporting pesticide use in rainy season rice indicates a low level of infestations of insects and pests, compared with spring rice.

	Ric	ce	Ma	aize	Vege	Potato	
Inputs (n=334)	Spring	Rainy	Spring	Winter	Spring	Winter	Winter
	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Purchased Seed	68.8	37.3	73.6	90.7	100	91.7	94.3
Water for Irrigation	99.0	97.9	90.6	93.2	100	97.2	82.4
Chemical Fertiliser	100.0	96.8	94.3	95.3	100	94.4	93.3
Organic Manure	68.2	53.6	96.2	89.8	100	97.2	97.4
Pesticide	94.8	83.9	79.2	87.7	100	88.9	89.1
Fungicide	19.8	9.2	18.9	22.9	16.7	66.7	88.6
Labour hired from outside	98.4	95.0	75.5	80.1	66.7	58.3	52.3

 Table 6.5-9
 Percent of Household Using Agricultural Inputs by Major Crops

Source: JICA Project Team

JICA Project Team can't list varieties used by farmers since only a few respondents (less than 25%) could tell the names of the varieties perfect. A large majority of the HHs stated the names of the varieties released by the NARC. The most is Indian hybrid varieties such as PPS4111, DKC 9081, and 900 M

Gold but farmers could tell only either 9081 or PPS or DKC. Many farmers reported using local rice varieties such as Kala Namak, Rato Basmati, Nuniya, and Basmati in addition to improved open-pollinated varieties released or registered by NARC.

6.5.4 Effect of COVID-19 in Agriculture

none of the respondents (334 respondents) had changed crops, varieties, cultivation period, cultivation area, and amount of produces sold due to the impact of COVID-19. This indicates that the COVID-19 had almost no effect on agriculture along the KIS command area. Overall, the JICA Project Team could verify this response from the following results of this baseline survey as well:

- i) More than 75% of the respondents did not need to follow any coping strategy after the occurrence of the COVID-19 pandemic,
- ii) Household dietary diversity remained unchanged before and after the COVID-19 pandemic,
- iii) The area comprises cereal-based cropping pattern, which is less affected than agriculture based on other agricultural commodities such as poultry, dairy, fisheries, and vegetables,
- iv) The area is self-reliant on food production, and more than 99% of the respondents were engaged in rice production in the rainy season; 80% of the respondents sold more than 57% of their produce. This suggests that KIS farmers could have benefited from the rise in price due to COVID-19 instead of encountering the effect of the price rise of major foodstuff. The economic ability of the HHs to access a variety of food is high.
- v) Average yield of rice and maize reported by the respondent further provides justifications in support of little/no impact of COVID-19 in the KIS area.

6.6 Market Information

JICA Project Team asked several questions to the respondents regarding a) where they sold their produces, b) if sold, to whom they sell, c) whether they adjust sowing or plantation time aiming to get better or a high price, d) how they transported or carried the produces to the markets and e) what their marketing constraints or challenges were. Of these five questions, the first three were explicitly asked for each cereals and vegetables because cereals are not a perishable commodity like vegetables, and marketing practices may differ. After receiving responses to the first three questions, the surveyors were required to follow the respondents with the last two questions.

6.6.1 Place for Sale of Agricultural Product

Table 6.6-1 show that 56.6% of the respondents sell cereals at the farm gate, and 48.5% of the respondents sell after bringing them to their respective houses. Given that the KIS area is a rice production area, cereals in this survey would mean just rice. Of the respondents, less than 1 % of the total respondents reported having sold in the Damak market and 2.4% in village markets, though the Damak market is near all four municipalities. Some villages or settlements of Shivasatakshi may be near Damak markets, and some settlements of Kamal, Gauriganj, or Gauradaha may be near Damak. Regardless, the proportion of HHs traveling to Damak to sell their cereals is not significant. Many farmers said that there is no need for them to travel to Damak or Birtamod market because the price they may get at their residences or villages will be the same as they would get at these markets and could save transportation costs.

Overall, the proportion of HHs selling vegetables was minimal even after combining those HHs who sold their produces in the winter and rainy seasons. However, the responses were slightly different from the respondents selling cereals. Of the respondents selling vegetables, 6.9% of the respondents sold from their house, 6.3% of the respondents sold in village markets, including weekly organized *Haat* market,

and less than 1% of the respondents sold at the farm gate (Table 6.6-2). Likewise, a few respondents travelled to Birtamod and Damak markets to sell their vegetables. 85.6% of the total respondents reported that they have no surplus amount for sale and they have consumed inside the households what they have produced.

SN	Market place	Gauradaha (n=87)	Gauriganj (n=57)	Kamal (n=35)	Shivasatakshi (n=155)	Total (n=334)
1	Farm gate	78.2	68.4	77.1	35.5	56.6
2	House	20.7	75.4	20.0	60.6	48.5
3	Village market	4.6	3.5	0.0	1.3	2.4
5	Damak market	1.1	1.8	0.0		0.9
6	Birtamod market	0.0	0.0	0.0	0.0	0.0
5	No surplus amount for					
3	sale/consumed by HHs	0.0	7.0	8.6	15.5	9.3

Fable 6.6-1	Percentage of Farmers'	Marketing Pi	ractice (Cereals)
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Note: Multiple answer are allowed

Source: JICA Project Team

Table 6.6-2 Percentage of Farmers' Marketing Practice (Vegetables)

SN	Market	Gauradaha (n=87)	Gauriganj (n=57)	Kamal (n=35)	Shivasatakshi (n=155)	Total (n=334)
1	Farm gate	3.4	0	0	0	0.9
2	House	1.1	0	8.6	12.3	6.9
3	Village market	0.0	7.0	2.9	10.3	6.3
4	Town/City market	0.0	0	0	0.6	0.3
5	Damak market	0.0	0	0	0.6	0.3
6	Birtamod market	0.0	0	0	1.3	0.6
7	No surplus amount for sale/consumed by HHs	95.4	93.0	91.4	76.1	85.6

Note: Multiple answer are allowed

Source: JICA Project Team

6.6.2 Purchaser of Agricultural Product

As shown in Table 6.6-3, most respondents (59.3%) sold cereals directly to retailers, followed by wholesalers (29.3%). The proportion of respondents preferring to sell the products to intermediaries or collectors was minimal. A key reason for the farmers' preference to sell to retailers was that they would get a higher price from the retailer than from the wholesalers. This is substantiated by the fact that nearly half of their cereals are sold from the houses. On the other hand, the respondents sold vegetables directly to consumers to draw higher prices for their produces (Table 6.6-4). Usually, consumers would prefer to buy fresh vegetables at farms. Procuring vegetables directly from producers is a win-win situation for producers and consumers. Indeed, consumers will need to pay a high price to buy at the markets and compromise with the freshness and quality.

	Gaura (n=	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		tal 334)
	No	%	No	%	No	%	No	%	No	%
Middleman/Collector	3	3.4	0	0.0	1	2.9	1	0.6	5	1.5
Consumer	1	1.1	1	1.8	2	5.7	10	6.5	14	4.2
Retailer	63	72.4	44	77.2	27	77.1	64	41.3	198	59.3
Wholesaler	32	36.8	7	12.3	4	11.4	57	36.8	100	29.9
Processing firm	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3
In the Market (Haat Bazar)	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3
Production is not enough for our own family	0	0.0	4	7.0	3	8.6	24	15.5	31	9.3

Table 6.6-3 Purchasers of Agricultural Products (Cereal)

Note: Multiple answer are allowed

Source: JICA Project Team

Table 6.6-4 Purchasers of Agricultural Products (Vegetable)

	Gaura (n=	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%	
Middleman/Collector	1	1.1	0	0.0	0	0.0	1	0.6	2	0.6	
Consumer	2	2.3	2	3.5	2	5.7	25	16.1	31	9.3	
Retailer	0	0.0	1	1.8	2	5.7	12	7.7	15	4.5	
Wholesaler	2	2.3	0	0.0	0	0.0	3	1.9	5	1.5	
Processing firm	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3	
In the Market (Haat Bazar)	0	0.0	1	1.8	0	0.0	0	0.0	1	0.3	
Production is not enough for our own family	83	95.4	53	93.0	32	91.4	119	76.8	287	85.9	

Note: Multiple answer are allowed

Source: JICA Project Team

6.6.3 Cultivation Schedule

The following table shows that 42.5% of the respondents decided sowing or plantation time based on their local practice, followed by traditional festival (36.5%) such as transplanting rice on Asar 15 of Nepali month and complete by 1st Shrawan (Sawane Sankranti) and following neighbours (19.5%). However, 1.2% of the total respondents adjusted sowing time /plantation period based on understanding the time when there would be rise and fall of market prices for the products. This attempt is specifically applied to perishable products like vegetables. For instance, there is distinct differences in the vegetable (tomato) price, which means that a farmer can be forced to throw vegetable price (tomato) just at NPR 5.00 or fetch even above NPR 100.00 per kg (Table 6.5-7). This suggests that a large majority of farmers following traditional practice to grow crops need to learn and practice market oriented agriculture.

Table 0.0-5 Dasis to Decide Sowing/Flanting Time												
	Gaura	adaha	Gaur	Gauriganj		Kamal		Shivasatakshi		otal		
	(n=	(n=87)		57)	(n=	35)	(n=1	155)	(n=334)			
	No	%	No	%	No	%	No	%	No	%		
Adjustment to market												
price/demand in the markets	2	2.3	0	0.0	0	0.0	2	1.3	4	1.2		
Considering traditional festival,	32	36.8	1	1.8	14	40.0	75	48.4	122	36.5		
Follow neighbourhood cultivation	33	37.9	12	21.1	11	31.4	9	5.8	65	19.5		
Follow local practice	20	23.0	44	77.2	10	28.6	69	44.5	143	42.8		
Source: JICA Project Team												

 Table 6.6-5
 Basis to Decide Sowing/Planting Time

6.6.4 Transportation of Agricultural Product

The following figure shows that the type of transportation mode while selling produces to the markets. 69.5% of the total respondents reported that the collectors/middlemen collected the products from their houses, followed by tractor (28.1%), bi-cycle (5.15), truck/pick-up van (4.2%), motor cycle and cart (1.2%). These responses further confirms that the proportion of the households reaching to market centres directly is very small (low access to market: 26.6%, Figure 6.7-1).

Currently, Nepal does not have any organized cereal crop market centres in any districts. Hence, for the marketing of cereals, traders usually come to the production sites, operate either temporary collection centres during the harvesting season, or collect produces from the producers directly from their respective houses. Some households may even transport produces to collectors' places through Bicycles, Motorcycles, or Cart when the collection centre is near their houses. Therefore, mode of transport is not a critical element for marketing cereals in the KIS command area, which already has several blacktopped roads and all-weather gravel roads inside the four municipalities. Besides these roads, the country's largest highway that runs across the Terai region of Nepal from Jhapa/Mechi Nagar (eastern border) in the east to Mahendranagar (western border) in the west cutting across the entire width of the country connects the two municipalities (Kamal and Shivasatakshi). Also, a postal road (Hulaki Road) located further south to the east-west highway planned to cross the eastern to the western border of Nepal passes by Gauriganj and Gauradaha municipalities. Many parts of this postal road, specifically lying in Jhapa district, are already blacktopped. Because some bridges are yet to be completed, this road has not yet come into operation but already serving people in the four municipalities.

For selling vegetables, KIS command area is located between two market centres, Birtamod where the federal government had established a wholesale agriculture produce market nearly 25 years ago and private wholesale and retail agriculture produce markets operate in Damak, just 3 km from Gauradaha's road-head in the abovementioned east-west highway- Padajunge. Besides, several private small fruit markets operate in all four municipalities. Thus, this survey confirms that peoples of these four municipalities have a high access to the markets.





Figure 6.6-1 Percentage of Transportation (n=334)

6.6.5 Constraints on Marketing

The following figure shows three top agriculture market-related problems that the total respondents have experienced. The highest constraint is low prices for the products (94.0%), followed by price fluctuations (40.4%), and low access to markets (26.6%). Their sufferings and low competitiveness were due to the flow of cheap Indian produce. Specifically, vegetables entered into Nepali markets and nearby areas, including door-to-door services by informal cross-border mechanisms without payment of customs duty and necessary quarantine checks for the pesticides residues. According to them, virtually, this phenomenon has impeded their access to markets in Nepal.



Note: Multiple answer are allowed Source: JICA Project Team



6.6.6 Agricultural Business Plan

Of the total respondents in the four municipalities, 2.4% of the respondents reported having prepared agribusiness plans as shown in the following table. However, the agribusiness plan what the respondents were reporting was just a rough plain paper or note prepared by the respondents, which included just the name of crops, tentative area, inputs used, and costs incurred. No respondents knew what an agricultural business plan meant, its components and essentials, and how it should be used. Therefore, prior to assisting the target groups in preparing the agricultural business plan, the most important activity to be carried out is to make them aware of the importance of the business plan, why it should be prepared, and let them learn how to prepare it by themselves.

	Gauradaha Gauriga (n=87) (n=57)		iganj 57)	ganj Kamal 57) (n=35)		Shivasatakshi (n=155)		Total $(n=334)$		
	No	%	No	%	No	o % No %		No	%	
Yes	5	5.7	0	0.0	0	0.0	3	1.9	8	2.4
No	82	94.3	57	100.0	35	100.0	152	98.1	326	97.6

 Table 6.6-6
 Percentage of Preparing Agricultural Business Plan

Source: JICA Project Team

6.6.7 Market Price Information

As shown in Table 6.6-7, 79.6% of the total respondents collect market price to sell their products, while the lack of the market price information was one of the key market constraints reported by 20.1% (Table 6.6-2). The highest proportion is Gauradaha (96.6%), followed by Kamal (94.3%), Gauriganj (75.4%) and Shivasatakshi (68.4%). Yet, Table 6.6-8 reveals that 78.7% of the total respondents sold their products based on the market prices informed by traders, followed by neighbours/relatives (65%). This suggests that the producers preferred to triangulate the market price information provided by the traders

through different sources, which include neighbours (65%), village shops (9.3%), FM Radio (3.6%). Surprisingly, the proportion of the HHs getting market price information from mobile phones and newspapers was very low (0.6%) each. None of the respondents reported watching television to collect market price information. This indicates the limited use of modern information and communication facilities to collect market price information, though all respondents have mobile phones and television is quite common in KIS.

	Table 0.0-7 Tereentage of Concetion of Market Tree Information										
Gaura	Gauradaha Gauriganj		iganj	Kai	nal	Shivas	atakshi	Total			
(n=	87)	(n=	57)	(n=35)		(n=155) (n=		(n=155)		334)	
No	%	No	%	No	%	No	%	No	%		
84	96.6	43	75.4	33	94.3	106	68.4	266	79.6		

 Table 6.6-7
 Percentage of Collection of Market Price Information

Source: JICA Project Team

1 able 0.0-0	Conection of Warket i fice information									
	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Neighbours/Relatives	60	69.0	34	59.6	28	80.0	95	61.3	217	65.0
FM Radio	0	0.0	0	0.0	0	0.0	12	7.7	12	3.6
Village shops	18	20.7	1	1.8	8	22.9	4	2.6	31	9.3
Mobile Phone	2	2.3	0	0.0	0	0.0	0	0.0	2	0.6
Newspaper	0	0.0	0	0.0	0	0.0	2	1.3	2	0.6
Trader/ Retailers in market	86	98.9	40	70.2	33	94.3	103	66.5	263	78.7
TV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Government officials/ Extension officer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Table 6.6-8	Collection of Market Price Information
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Note: 1) Multiple answer are allowed

2) Others include: Rice mill Source: JICA Project Team

6.7 Services Provided by Government

Individual baseline survey has attempted to find out the services provided by government agencies to individual farmers.

6.7.1 Municipalities

As shown in the following figure, there is no any support on rehabilitation and minor repair and marketing support to farmers by the four municipalities. Among the services provided by municipalities, delivery of subsidized farm inputs is the highest (7.8%). Other services provided by municipalities are delivery of subsidized agricultural machinery (5.1%), operation and maintenance (2.1%), diagnosis support on production related problem at site (1.8%) and farmer group organization/mobilization (1.5%). Kamal municipality is ahead among all municipalities on providing support to farmers.

	age of Sel He		• ~ J 1.1 a	-punty	
Types of Services	Gauradaha (n=87)	Gauriganj (n=57)	Kamal (n=35)	Shivasatakshi (n=155)	Total (n=334)
Rehabilitation and minor repair	0	0	0	0	0
Operation and Maintenance	3.4	0	8.6	0.6	2.1
Farmer group organization/mobilization	2.3	0	6	0.6	1.5

 Table 6.7-1
 Percentage of Services Delivered by Municipality

Technical Cooperation Project for the Promotion of Irrigated Agriculture in Terai Plain Baseline Survey Report

Types of Services	Gauradaha (n=87)	Gauriganj (n=57)	Kamal (n=35)	Shivasatakshi (n=155)	Total (n=334)
Delivery of subsidized farm inputs (seeds, fertilizers, pesticides etc.)	6.9	7.0	22.9	5.2	7.8
Diagnosis support on production related problems at site	3.4	0	8.6	0	1.8
Delivery of subsidized agricultural machinery	6.9	5.3	8.6	3.2	5.1
Marketing support	0	0	0	0	0

Note: Multiple answer are allowed Source: JICA Project Team

6.7.2 AKC

The following table shows the awareness of the respondents about government agricultural agency, Agriculture Knowledge Centre (AKC). Out of the total respondents, 61.4% of the respondents have no idea about AKC. 36.5% of the respondents have accepted that they have just heard about AKC. Only 2.1% of the respondents have given the information that they know about the AKC and also have participated in the programme conducted by AKC.

Tuble of 2 Respondent II wat chess of right calculation intrage of the								
	Yes (Just heard)		Participated	l in Program	No/ No information			
	No	%	No	%	No	%		
Gauradaha (n=87)	43	49.4	5	5.7	39	44.8		
Gauriganj (n=57)	17	29.8	1	1.8	39	68.4		
Kamal (n=35)	12	34.3	1	2.9	22	62.9		
Shivasatakshi (n=155)	50	32.3	0	0.0	105	67.7		
Total (n=334)	122	36.5	7	2.1	205	61.4		

 Table 6.7-2
 Respondent Awareness of Agricultural Knowledge Centre

Source: JICA Project Team

6.7.3 Private Extension Services

The following table shows that 53.6% of the respondents got extension advisory services on agriculture by agro-vet traders of local area, whereas 48.2% of the total respondents received extension advisory services by their neighbours. Agricultural cooperatives /Small Farmers Agriculture Cooperative are the other source by which 22.5 % of the total respondents got advisory services on agriculture. Freelance expert and private farms/enterprises are also the source for advisory services from where 1.5% and 0.9% respondents receive the services respectively.

Alternative Service	Gaura (n=	adaha 87)	Gauri (n=:	iganj 57)	Kar (n=	mal 35)	Shivasa (n=1	takshi 55)	Total (n=334)
Floviders	No	%	No	%	No	%	No	%	No	%
Agricultural										
cooperatives/SFAC	56	64.4	1	1.8	4	11	14	9.0	75	22.5
Agro-vets	67	77.0	6	10.5	29	83	77	49.7	179	53.6
Private farms/enterprises	2	2.3	0	0.0	1	2.9	0	0.0	3	0.9
Freelance experts	3	3.4	0	0.0	1	2.9	1	0.6	5	1.5
Neighbours	60	69.0	2	3.5	23	66	76	49.0	161	48.2
Notes Multiple analyses and allowed	1									

 Table 6.7-3
 Services from Private Extension Services

Note: Multiple answer are allowed Source: JICA Project Team

6.7.4 Agricultural Research Farms /Stations

The table below reveals that there is almost no tendency of farmers to visit agriculture research farm /stations by which farmers could be benefitted. The survey data shows that only 1.5% of the total

respondents have experience of visiting agriculture research farm and 98.5% of the respondents have no any experience of visiting such farm /stations.

				/	
Municipality	Ye	es	No		
Municipanty	No	%	No	%	
Gauradaha (n=87)	3	3.4	84	96.6	
Gauriganj (n=57)	0	0.0	57	100.0	
Kamal (n=35)	0	0.0	35	100.0	
Shivasatakshi (n=155)	2	1.3	153	98.7	
Total (n=334)	5	1.5	329	98.5	

 Table 6.7-4
 Experience to Visit NARC (FY2020/2021)

Source: JICA Project Team

Likewise, no officers from Nepal Agricultural Research Counsel (NARC) has visited farm land to provide advisory services on agriculture as shown in the following table.

Municipality	Y	es	No		
Municipanty	No	%	No	%	
Gauradaha (n=87)	0	0	87	0	
Gauriganj (n=57)	0	0	57	0	
Kamal (n=35)	0	0	35	0	
Shivasatakshi (n=155)	0	0	155	0	
Total (n=334)	0	0	334	0	

Table 6.7-5 Visit of NARC Officers to Farm Land

Source: JICA Project Team

6.7.5 Participation in Training over the Last Two Years

As shown in the following table, 87.7% of the total respondents have said that they are not taking any training on agriculture over the last two years. Only 11.7% of the total respondents have participated in trainings organized by different agencies.

		0		
Y	es	No		
No	%	No	%	
15	17.2	70	80.5	
6	10.5	51	89.5	
4	11.4	31	88.6	
14	9.0	141	91.0	
39	11.7	293	87.7	
	Y No 15 6 4 14 39	Yes No % 15 17.2 6 10.5 4 11.4 14 9.0 39 11.7	Yes No No % No 15 17.2 70 6 10.5 51 4 11.4 31 14 9.0 141 39 11.7 293	

Table 6.7-6	Participation	in Training

CHAPTER 7 MAJOR FINDINGS AND KEY RECOMMENDATIONS

7.1 Major Finding at Each Survey

Many findings and issues have been found during the baseline survey. Some are related to canal irrigation and some are related to agriculture. The findings might be useful if addressed from respective sectors for the overall proper management of Kankai Irrigation Management Office (KIMO) and Kankai Canal Water Users Association (WUA) as follows:

7.1.1 Online Interview with Kankai Irrigation Management Office

- KIMO and WUA did not regularly update the command area under secondary canal (SC), tertiary canal (TC) and direct tertiary outlet (DTO). That is why some mismatch on command area is found in website, hording board and some publications. The command area reported by KIMO is 6,950 ha but the actual command area is needed to confirm under the Project.
- 2) Kankai Irrigation Scheme (KIS) received the new development support and also technical support from Irrigation and Water Resources Management Project (IWRMP: 2008-2018). However, some important activities conducted in IWRMP (e.g., preparation of cropping calendar and water distribution plan, asset management plan, updating of command area) does not continue by KIMO and WUA. JICA Project Team will refer the information and material prepared by IWRMP for the Project activity if necessary.
- 3) The major issue in O&M of KIS is deterioration of irrigation facilities because irrigation facilities were constructed in 1980s and it passed more than 40 years. Annual maintenance plan is prepared but not for long-term maintenance plan. Inventory sheet of irrigation facilities was established by IWRMP but it was not updated based on the actual condition.
- 4) The O&M of irrigation facilities under secondary canal is basically the responsibility of WUA. As per irrigation management transfer (IMT) agreement, KIMO provided financial and technical support for the rehabilitation when WUA faced the difficulties to maintain their facilities in good condition. There are strong relationship with each other to keep KIS works properly.
- 5) KIMO engineers have a capacity to execute their budget more than NPR 100 million. However, the number of technical staffs in KIMO is not enough in construction period.

7.1.2 Online Interview with Main Canal Committee

- i) WUA has a firm structure to authorise their organization and manage their fund. As per Bylaw, WUA provides membership to water users and has a three-tier elected committees. They keep documentation regularly and conduct proper audit every year in accordance with the government regulation.
- ii) According to main canal committee (MCC), it has distributed membership to 5,970 households (HHs) as of FY 2020/2021 but the users could be more because some households have been divided and others have newly settled. The outlet wise farmer list with plot No. and its area is not available. So, WUA cannot recognise and update how many water users settle in KIS. This necessitates updating the members/users so that water could be distributed equitably and also irrigation service fee (ISF) could be collected from all users.
- iii) In some secondary canal committees (SCCs) /tertiary canal committees (TCCs) /direct tertiary canal committees (DTOCs), the ISF collection rate was low. Based on the interview with MCC, the top three problems on ISF collection were found as follows:
 - 1. No action against those who does not pay ISF,
 - 2. Users' tendency not to disclose actual irrigated area, and
 - 3. Inequitable distribution of water.

iv) The current command area was not updated regularly so the total ISF to be paid by all water users could not be confirmed (GIS analysis is undergoing). The Project Team tentatively estimated the ISF collection rate as shown in the following table. ISF collection rate is 37.6 % in FY 2018 /2019, 29.2% in FY 2019 /2020 and 34.7% in FY 2020 /2021.

Table 7.1-1 Tentative 151 Conection Rate								
Fiscal Vacr Rainy		Spring	Estimated Total ISF	Actual	Tentative ISF			
Fiscal Teal	Season	Season	to be paid (NPR)	Collected ISF	Collection Rate			
2018/2019	6,950 ha	3,408 ha	4,661,100	1,751,216.00	37.6%			
2019/2020	6,950 ha	3,810 ha	4,842,500	1,414,681.75	29.2%			
2020/2021	6,950 ha	3,408 ha	4,661,100	1,617,183.00	34.7%			

Table 7.1-1 Tentative ISF Collection Rate

Note: Condition for Estimation of ISF Collection Rate: The command area of KIS: 6,950 ha (KIMO, Asset Management Plan 2017), Rotation Area in Spring Season: FY 2018/2019, 2020/2021 is 3,408 ha (SC 0, 13 to 21), FY 2019/2020 is 3,810 ha (SC 0 to 12), Irrigation Service Fee: NPR 450 /ha /season (WUA, By-law)
 Source: JICA Project Team

- v) MCC reiterated that taking action (sanction) against illegal water users is very difficult and not effective. Though there is provision of irrigation act by the Government but it is not strictly implemented. WUA would like to get assistance of municipalities for ISF collection.
- vi) MCC provides the rental service of heavy equipment to individual/ organization. This earning is one of the large income source for WUA. MCC has a specific sub-committee to operate and maintain the heavy equipment for more than 10 years.

7.1.3 Field Interview with Secondary Canal Committee

- 1) SCCs do not maintain any record regarding ISF collection but MCC manages (e.g., actual number of ISF payers, ISF paid amount). SCCs have answered with very rough assumption.
- 2) ISF collected from farmers is directly deposited to MCC with receipts where name of users and collected ISF amount is mentioned. According to the receipts, MCC prepares document detailing amount to be distributed to the respective TCCs, SCCs, share of MCC, remuneration for the collectors and revenue to the government. MCC office manager calculates the ISF on MS Excel and divides ISF as per Irrigation Regulation and By-law of WUA. MCC sends the one-page summary to the respective SCC for their reference.
- 3) Major income source is ISF for almost all of SCCs but there is a tendency that water users do not pay actual ISF as per land holding. Users having small size land are paying actual ISF but users having large land escape to pay ISF as per actual. This is the most important issue for WUA on the collection of ISF.
- 4) Some SCCs generate additional income by selling grasses grown along canal area (e.g., SCC 01). O&M fee is not specified in By-law but some SCCs voluntary collect O&M fee with the permission of General Assembly. During the survey, it was found that only SCC 0 and 10 collect fee for O&M of its canal.
- 5) Basically, flood irrigation practice is applied and field channel in TC are not constructed enough because many users do not realize the necessity of field channels. Due to the economic value (cost) of the land, most of landowners are found reluctant to allow his/her land to construct field channels passing from his/her land.
- 6) Most of SC where canal water is not sufficient and regular, the farmers have tried to install shallow tube well either through the assistance of the local governments or other development agencies. Many agencies are also providing shallow tube well on grant even in KIS command area. The Government provides rebate on the electricity tariff for the shallow tube well to farmers who uses electricity to operate the pump for underground water for irrigation.
- 7) Canal cleaning is mostly done before rainy season once a year. A few SCCs depend on MCC for canal cleaning work and leave ISF amount in MCC. MCC itself undertakes most of the

cleaning work by using its excavator. MCC adjusts the cleaning cost with ISF collected from the respective SCC so that SCC do not have to pay the cost of cleaning of canal.

- 8) The benefitted SCCs in KIS are from head part of main canal in the view of getting irrigation water. They have well-developed tertiary canal, whereas SCCs from tail part are not benefitted well and they don't have well-developed tertiary canal (e.g., SC 17, 18, 19, 20 and 21).
- 9) SCC where land owners are not available in KIS are facing many problems like ISF collection, canal extension, field channel construction etc. (e.g., SCC 18, 19, 20 and 21).
- 10) SCC 0 consist unique features which is different from the remaining SCCs.
 - a) SCC 0 collects NPR 900 /ha every year as O&M fee from all users in addition to ISF.
 - b) SCC 0 get water all-round the year from canal. No rotation system is applied for this SC so far.
 - c) SCC 0 and its TCCs jointly collect and receive ISF share for not only SCC but also for TCCs.
 - d) Most area of SC 0 has sandy soil and requires more water for irrigation. Shallow tube well (STW) is technically not feasible to install.
 - e) Only land owner is eligible for membership of WUA, though there is provision of getting membership also for non-owner in By-law of WUA.

7.1.4 Field Interview with Individual Farmers

As stated earlier, the JICA Project Team interviewed 334 individual farmers from 22 SCCs, of which 24.3% of the total respondents were female, and 75.7% of the total respondents were male. The main findings and recommendations are summarized below:

i) Average landholding area, agricultural land, agricultural land for crops by municipality are presented below:

SN	Average Landholding Area (ha/household)	Average Agricultural Land (ha/household)	Average Agricultural Land for Crops (ha/household)
Gauradaha (n=87)	2.01	1.90	1.79
Gauriganj (n=57)	1.78	1.55	1.52
Kamal (n=35)	1.33	1.52	1.12
Shivasatakshi (n=155)	0.99	0.84	0.82
Total	1.43	1.28	1.22

 Table 7.1-2
 Average Landholding Area, Agricultural Land per Household

Source: JICA Project Team

ii) The survey data showed 63% of the total respondent households (HHs) have personal shallow tube well (STW). Data below shows irrigation status by four municipalities. Though 63% of the total respondent HHs reported to own STWs, the survey found low use of STW, as exemplified by low intensification rate and limited areas under the vegetables and other cash crops. Repair and maintenance of irrigation equipment is obviously important to keep the machines going throughout the dry season and thus prevent crop damage.

Table 7.1-5 Tercentage of Households using 51 W								
Access to	Gauradaha	Gauriganj	Kamal	Shivasatakshi	Total			
Irrigation	(n=87)	(n=57)	(n=35)	(n=155)	(n=334)			
Percentage of								
households using								
STW (%)	82.8	81	54.3	47.7	63.2			
Source: JICA Project Tea	т							

Table 7.1-3 Percentage of Households using STW

iii) Overall, the average annual agricultural income (crops) at NPR 94,400 with the highest NPR 156,600 in Gauradaha, followed by Gauriganj (NPR 105,300), Kamal (NPR 88,000), and the lowest in Shivasatakshi (NPR 56,900). The share of agricultural income from Crop to the total income was 23.4% in total. Of the total agricultural income, the percentage income earned from crops was highest in Gauriganj (74.5%), followed by Gauradaha, Kamal, and Shivasatakshi (48.9%).

There is no substantially difference in the agricultural income received from crop sources between model and non-model sites, although it was slightly higher in model TCC (NPR 97,300), than model SCC (NPR 95,300) and the non-model SCC (NPR 93,900).

	Gauradah (n=87)		adaha 87)	Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
SN	Income	(NPR '000)	(%)	(NPR '000)	(%)	(NPR '000)	(%)	(NPR '000)	(%)	(NPR '000)	(%)
1	Agriculture	229.8	42.7	141.5	39.6	161.3	36.6	116.2	34.5	154.9	38.4
1.1	(Crops)	156.6	29.1	105.3	29.5	88.0	20.0	56.9	16.9	94.4	23.4
1.2	(Other Sources)	73.2	13.6	36.2	10.1	73.3	16.6	59.4	17.6	60.5	15.0
2	Non-agriculture	307.9	57.3	215.4	60.4	279.5	63.4	221.0	65.5	248.8	61.6
3	Total	537.7	100.0	356.8	100.0	440.7	100.0	337.3	100.0	403.7	100.0

Table 7 1-4	Average Agricultural Income by Municipality
1 able /.1-4	Average Agricultural income by Municipality

Note: Crop includes cereal, vegetable and fruit. Other sources includes fishery and livestock Source: JICA Project Team

- iv) Data show that 52.4% of the total respondent HHs had an income higher than the annual expenditure. Overall, 24.3% of the total expenditure is spent on food, followed by agriculture production (22.2%), education (14.1%), utilities (11.6%), health/medical (9.6%), and interest payment (8.3%), clothing (6.7%).
- v) Based on the household dietary diversity assessment, the baseline survey concluded that the economic ability of the respondent HHs has not been substantially affected by COVID-19 pandemic. This was further confirmed by the livelihoods assessment when the respondent HHs were asked, did anyone in their household had to engage any of the nine specified coping strategies (Table 6.3-13) due to a lack of money to buy food. The survey results revealed 85% of the total respondent HHs did not need to adopt any coping strategies, 13.5% of the total respondent HHs had to follow stress strategy and 1.5% used crisis and emergency strategy.
- vi) In FY 2020/ 2021 rainy season, 76.7% of the total respondents felt the availability of canal water as "Adequate" or "More than adequate", while almost all respondents cultivated their land. SC 5, 6, 10 and 11 (the tail end of phase1) and SC 13 to 21 (developed in phase 2) have high proportion in "Not water at all" and "Not adequate"
- vii) In FY 2020/2021 winter season, 237 respondents (76.0%) felt the provision of canal water is "Not adequate" or "Not water at all", while 93.4% of the total respondents cultivated their land. Also, a differences of water availability was found in the same SCC. However, SCCs located upstream (e.g. SC 0,1,13,14) are satisfied in the water distribution.
- viii) In FY 2020/2021 spring season, SC 0, 13 to 21 is the area can receive water under rotation al system. more than 50% of the total respondents from SC 0, 13 to 21 answered as "More than adequate" or "Adequate" except for SCC 15, 19 and 20 (SCC,0 11 to 22: 89.8% of the respondents cultivated land). It means that rotational system works properly to deliver water. It is also found shallow tube well is used where irritation water is not available (32.6% of respondent). However, SC 1 to 6 might take the irrigation water from canal even they cannot take canal water.
- ix) Currently, there is no formal written document which indicates Main Canal, Secondary Canal, Tertiary Canal wise water distribution and maintenance plan but they have some kind of internal rule for water distribution and internal plan for repair /rehabilitation shared within SCCs/TCCs/DTOCs (65.6% and 44.0% of the total respondents reported they have a water distribution plan and a maintenance plan, respectively). Farmers feel that water distribution plan is necessary for equitable water distribution based on cropping calendar.

- x) In 2020, 57.2% of the total respondents in four municipalities cultivated spring rice but the area under the spring rice was less than one third (27.4%) of the total agricultural land, cultivated in 59.7 ha with average of 0.18 ha per HH.
- xi) Overall, the cropping intensity in the surveyed area is 148.6% with almost similar condition in four municipalities, as shown below.

Name of Municipality	Total Agricultural Land (ha)	Cropping Intensity (%)			
		Spring	Winter	Rainy	Total
Gauradaha	165.1	36.2	19.9	90.3	146.4
Gauriganj	88.5	30.4	15.7	96.3	142.5
Kamal	43.5	34.9	25.5	89.3	149.7
Shivasatakshi	129.8	31.8	31.1	94.0	156.9
Total	426.9	33.1	23.0	92.6	148.6

 Table 7.1-5
 Cropping Intensity by Municipality

- xii) No respondent farmers have changed crops, varieties, cultivation period, area, and amount of produces sold even though they experienced the severe impact of COVID-19.
- xiii) 86.4% and 14.9% of the total respondents sold their rice and maize (major staple crops) cultivated in spring season, respectively. The data show that 56.6% of the total respondents sold cereals directly from their respective farms and 48.5% of the total respondents sold after bringing them to their respective houses. 0.9% of the total respondents reported having sold cereals in the Damak market and 2.4% of the total respondents in village markets.
- xiv) Overall, the respondents in KIS have high access to the fruit and vegetable markets. Four municipalities covering KIS are located within the range of 20 km from two big cities of Jhapa (Damak and Birtamod) and connected by the East-West Highway and Postal Highway (under construction). Birtamod has a government-managed wholesale agriculture produce market (fruits and vegetables). Damak has a well-managed fruit and vegetable market under private management. Many small permanent fruit and vegetable markets and weekly *Haat Bazar* operate within the boundaries of four municipalities. Besides these, Shivasatakshi municipality has initiated the construction of a new market centre at Shivagunj Bazar through the provincial government's conditional grant, and a new market is ready to operate at Gauradaha constructed through province government conditional grant for the municipality.
- xv) Overall, 42.5% of the total respondents reported that they decide sowing or plantation time based on their local practice, followed by traditional festival (36.5%) and neighbours (19.5%).
- xvi) The top three constraints reported by the respondent farmers are low prices for the products (94.0%), price fluctuations (40.4%), and low access to markets (26.6%). Low access to the market does not mean physical access. However, this referred to the lowered competitive capacity of Nepalese farmers caused by the flow of cheap Indian produces entering into Nepali markets and nearby areas from bordering areas of India.
- xvii)Less than 3% of the total respondents reported having prepared agribusiness plans. However, the agribusiness plan what the respondents were reporting was just a rough plain paper or note prepared by the respondents, which included just the name of crops, tentative area, inputs used, and costs incurred. No respondents knew what an agricultural business plan meant, its components and essentials, and how it should be used.
- xviii) While the lack of the market price information was one of the key market constraints reported by 20.1% of the total respondents, 79.6% of the total respondents collected market price to sell their products with the highest proportion by Gauradaha (96.6%), followed by Kamal (94.3%), Gauriganj (75.4%) and Shivasatakshi (68.4%). Yet, 78.7% of the total respondents would sell their products based on the market prices informed by traders, followed by neighbours /relatives (65%).
- xix) The data shows that no local governments (four municipalities) have provided support for the rehabilitation, repair, and maintenance of the SCs, TCs, DTOs and the construction of field channels.

xx) Farmers' dependency to receive extension advisory services in agriculture from the agro-vets is high. 53.6% of the total respondents reported receiving these services from agro-vets, followed by neighbours (48.2%) and agricultural cooperatives (22.5%). Though 36.5% of the total respondents reported knowing Agriculture Knowledge Centre under the Ministry of Land Management, Agriculture and Cooperatives, 2.1% of the total respondents reported their participation in its programs. Less than 8% receiving services from the municipality agricultural sections with the highest in the delivery of subsidized farm inputs (7.8%), followed by delivery of subsidized farm machinery (5.1%) and support for the diagnosis of production-related problems at the site (1.8%). 87.7% of the total respondents reported that they have not participated in any agriculture training program organized by the government extension service over the last two years period.

7.2 Feedback to the Project Activities

7.2.1 Irrigation and WUA Activity

- According to the interview on individual farmers for the status of irrigated area and water availability, it is found that there is unequal water distribution between the upstream secondary canals and downstream canals. Water distribution from main canal to secondary canals and DTOs are under responsibility of KIMO. It needs to prepare the water distribution plan at least from the main canal to secondary canals based on the cropping calendar and control water discharge by KIMO.
- 2) There is no clear picture about the command area of KIS for proper planning. A joint work of WUA, municipalities, KIMO and JICA Project Team can determine the actual command area of KIS by using the latest IT technology (e.g., GIS)
- 3) It is also not clear the irrigation system diagram in the whole KIS up to tertiary canal level with the name of the canal, location of the water diversion structure (e.g., cross regulator, head regulator) and command area. KIMO has layout map of KIS, however the name of tertiary canals and DTOC are needs to be confirmed through joint walk through survey and to be shared with WUA.
- 4) It is necessary to reinform all water users of the ISF collection rule: WUA members, who are in the alternate seasonal rotation area in the respective year, have to pay ISF. And it is recommended that the rule should be clearly written in By-law of WUA.
- 5) Reliable database of users and land holdings is necessary for the ISF collection. A massive step on this issue must be launched together with all stakeholders of KIS.
- 6) For the strengthening of SCCs, orientation and basic practical training like account keeping, organizational development, irrigation technology are necessary.
- 7) There is gap of level of irrigation facilities between Phase 1 area (SC 1 to SC 12) and Phase-2 area (SC 0 and SC 13 to SC 21) as below:
 - a) In the most of secondary canals in Phase 2 area, gates for control of water distribution are not installed at head regulator and cross regulator. This is one of the reasons of difficulties of proper water management along SC.
 - b) Most SCCs in Phase 2 area responded their tertiary canals were not well constructed or incomplete.
 - c) The measuring devices are not installed at secondary canals of SC 13, SC 17 to SC 21 and DTOs along main canals in Phase 2 area.

In order to solve the above problems and establish equal water distribution in the whole KIS area, it is necessary to make the same level of irrigation facilities such as i) installation of head regulator and cross regulator gates, ii) construction of tertiary canal and iii) installation of measuring devices at least in all SCs. The inventory data of irrigation facilities updated by joint walk-through survey and mid-term budget plan for the above works are required.

8) There are either no provision of stoplog and gate at diversion structure along TC and division box along field channel. Stoplog should be provided in necessary places by farmers themselves for efficient water distribution in on-farm level.

7.2.2 Agriculture

- i) A cereal-based farming system dominates the KIS area. However, there is a need for the farmers to transform their conventional farming system into commercial and prioritize to grow high-value commodities like vegetables by integrating with the needs and demands of the market.
- Several opportunities exist in and around four municipalities to increase the productivity of cereal crops, get technical advisory services, and link with the markets. Therefore, the Project, with the support of the Project Task Team members (KIMO, municipalities, WUA), will need to deliver technical assistance to the farmers to enable them to benefit from such opportunities.
- iii) Shortage of agricultural labour is the real problem of the farmers in the KIS area. Therefore, agricultural mechanization could provide one effective solution to this problem.

7.2.3 Overall (Integration of Irrigation and Agriculture Activities)

- Cropping calendar in the whole Kankai Irrigation System in three cropping season need to be optimized considering the key factors of i) water availability, ii) required cultivation period, iii) profitability. At present, many farmers are cultivating the spring rice in spring season and KIMO/WUA apply the alternate seasonal rotation. However, the irrigation water is not available for cultivation of spring paddy in the whole rotational area due to the limitation of river discharge. The promotion of maize production or other commercial crops in winter /spring season with increase of cultivation area is one of the recommended solution.
- 2) Since farmers cannot take water from canal during the cleaning and maintenance period, annual cropping calendar shall include such a period.
- 3) Given that many other alternative crops are available for the spring season, the cropping intensity and water utilization rate could be increased if farmers who grow any crops in the spring season using the KIS canal pay ISF twice, not limiting to spring rice only.
- 4) There is a strong need for the effective coordination among KIS key stakeholders (WUA, KIMO, SCCs, TCCs, LGs) to increase the regularity, reliability, and responsiveness in the equitable water distribution system in the canal irrigation system (MC, SCs, TCs, DTOs and field channels), and to assist farmers/water users to maximize the use of irrigation water to increase the productivity of water and crops so that the farmers could increase their income.
- 5) A technically sound irrigation system alone does not ensure optimum and efficient water utilization. Due to several socio-economic and marketing constraints including timely delivery of technology transfer services, many farmers are not able to access agricultural inputs for farming or selling their products. Water is necessary but not adequate to increase productivity and increase income of farmers. Therefore, the Project with the unified support of the Project Task Team members, province governments, specifically MoLMAC and MoPID, assist the farmers to integrate crop and water management through capacitated WUA.
Phase II Project Design Matrix (PDM)

Project Title : Project for the Promotion of Irrigated Agriculture in Terai Plain

Implementing Agency : Department of Water Resources and Irrigation (DWRI), Ministry of Energy, Water Resources and Irrigation (MOEWRI) Cooperation Agency : 4 municipalities (Shivasatakshi, Gauradaha, Gaurigunj, Kamal) related to Kankai Irrigation Scheme, Government of Province No. 1 (MOPID, MOLMAC, AKC, ABPSTC), Ministry of Agriculture and Livestock Development (MOALD), and Department of Agriculture (DOA)

Direct Beneficiaries : Farmers in Kankai Irrigation Scheme (5,803 Households as of 2017/18), staffs of DWRI, 4 municipalities and Government of Province No.1

Indirect Beneficiaries : Farmers of Terai irrigation area, staffs of Federal, Provincial and Local Governments in Terai irrigation area

Cooperation Period : 6 years (2019- 2025)

Target Area : Kankai Irrigation Scheme

Extension Area : Terai Irrigation Area

			28 September 2020
Narrative Summary	Objectively Verifiable Indicators	Means of Verifications	Important Assumptions
Overall Goal	Number of Irrigation schemes where	Report of DWRI	
The Model Developed by the Project is practiced in Terai Irrigation Area.	the Model has been practiced.		
Project Purpose			Government policy
The Model of Irrigated Agriculture is formed by the collaboration among the Federal, Provincial, Local Governments and Water Users Associations (WUAs).	The Model of Irrigated Agriculture developed by the Project is approved by the JCC.	Minutes of JCC	of Nepal on Irrigated Agriculture will not change largely.
Outputs			The Project
1. The issues regarding the Irrigated Agriculture in Kankai Irrigation Scheme are analyzed and shared by the stakeholders, and the Action Plans for solution of the issues are formulated.	Formulated Action Plans	Project Report	implementation System of DWRI, Provincial Government, Municipalities and
2. Equitable and efficient water distribution system is established by the improvement of water distribution planning and its implementation up to tertiary level, appropriate operation & maintenance of facilities and constructions of field channels, etc.	 Formulation of water distribution plan up to tertiary level, based on the cropping calendar and its implementation Constructions of	1)Reports of KIMO and WUAs 2)Interview with KIMO and WUAs, On-site inspection 3)Reports of KIMO and WUAs, On- site inspection 4)Reports of KIMO and WUAs, Interview with farmers 5)Report of WUAs	WUAs concerned will not change largely. Market Circumstance of agricultural products will not change largely.
3. The income and technical capacity of farmers in target scheme are increased through the practice of market-oriented agriculture.	 1)Increase of targeted farmers' agricultural incomes of by ○○% 2)○○% of farmers make farm business plan and perform the market oriented activities based on the plan 	 Reports of Baseline and End line Surveys Interview with the farmers Report of monitoring results on the cooperation activities Drafts of guidelines and manuals 	

4. The Activity Execution Cooperation System for improvement of irrigated agriculture among stakeholders of Kankai Irrigation Scheme is established, and the results of the cooperation activities are diffused to other irrigation schemes in Terai area through the trainings. Activities	 Number of cooperation activities and these contents based on the results monitoring Formulated drafts of guidelines and manuals Number of trainings, training participants, and the level of understanding 	3)Report on the results of trainings	The frequent
1-1 The baseline survey is implemented.			change of
 1-2 Necessary Training Materials for the improvement of Irrigated Agriculture in Kankai Irrigation Scheme are prepared. 1-3 Trainings to Kankai Irrigation Schemes' Stakeholders for the improvement of 	Japanese Side	Nepalese Side	counterpart personnel does not occur.
 Irrigated Agriculture are implemented. 1-4 C/P training in Japan is implemented. 1-5 The follow-up of C/P training in Japan is carried out and the Action Plans for improvement of Irrigated Agriculture in Kankai Irrigation Scheme are formulated. 1-6 Mini-Projects (trial) are implemented. 1-7 The Action Plans are revised based on the results of evaluation on Mini-Projects. Improvement of Water Distribution Planning and its Implementation 2-1 Irrigation command area in Kankai scheme is updated using geographic information system (GIS). 2-2 The trainings on cropping calendar, crop water requirement, formulation of water distribution plan, water management techniques and land levelling are provided to KIMO staff, WUA's members and agricultural extension officers. 2-3 Water distribution plans (from main canal upto fields channel) are formulated based on the cropping calendars. 2-4 Gate operators and Water Users Committee member (any representative) in MCs (water distribution from MCs to SCs, supplementary as necessary) and in SCs (water distribution from SCs to TCs) are appointed, and the trainings on diversion discharge measurements are carried out to them. 2-5 Water measuring devices (gauge painting/ installation and calibration) from MCs to SCs (lacking points) and from SCs to TCs and Division Box are installed. 2-6 The water diversions to SCs and TCs are implemented based on water distribution plans. 2-7 The committees at MC, SCs and TCs levels are formed and the Monitoring & Evaluations on the situations of water distributions are carried out, and based on that, the facility maintenance/repair plans (medium-term, annual) are formulated. 2-9 The function diagnosis on irrigation facilities are carried out, and based on that, the facility maintenance/repair plans (medium-term, annual) are formulated, and necessary costs are estimated. 2-10 Simple and transparent Irrigation Service F	 1.Dispatch of Experts 1)Chief Advisor/ Market-Oriented Agriculture 	 Assignment of Counterpart Personnel Project Director (Deputy Director General of DWRI) (Assisted by SDE and Engineer) Project Manager (Senior Divisional Engineer of Kankai Irrigation Management Office <kimo>)</kimo> Counterpart Personnel (KIMO, Municipalities concerned) Provision of Project Office for JICA Expert Team at KIMO Allocation of Counterpart Funds (Business Trip Expenses of C/P, Activity Costs, etc.) 	

2-11 The activities towards the increase of ISF collection rate are carried out by	
WUAs, and ISE collection data and users' records, etc. are computerized (record	
keeping).	
2-12 The trainings on techniques of facility maintenance & repair are provided to	
WUAs members.	
2-13 The facility maintenance & repair works are implemented based on the plans	
utilizing the budgets of KIMO. Municipalities and WUAs.	
Construction of Field Channels, etc.	
2-14 The survey, planning and design for the constructions of field channels (4 th	
channel) and diversion boxes (from TCs to field Channels) are conducted, and	
the field channels and diversion boxes are constructed by the funds of KIMO and	
WUAs.	
2-15 The lands leveling are carried out.	
3-1 The Trainings of Trainers (TOT) on market-oriented agriculture are implemented	
to Agricultural Extension Officers and Subject Matter Specialists (SMS).	
3-2 The trainings on market-oriented agriculture to farmers (sensitization workshop,	
market survey, farming action planning, and so on) in the field base practice are	
implemented.	
3-3 Facilitate forum between the farmers and agricultural business stakeholders.	
3-4 The technical demonstration to the farmers on target crops, which are selected	
through market surveys, are implemented through field practice.	
3-5 Conduct study tour for the farmers to expose them successful market-oriented	
agriculture.	
4-1 The Activity Execution System among Federal, Provincial, Local Governments	
and WUAs is formed by Project Management Committees (PMC) and Task	Precondition
Team, and the activities on the Result 2 and 3 and monitoring are	The Bublic Sefety
implemented.	in Tarai alain will
4-2 The drafts of the guidelines and manuals on the promotion of irrigated	in Terai plain will
agriculture for Federal, Provincial, Local Government and WUAs are	not getting worse.
tormulated by the Lask Leam.	
4-3 The trainings on the promotion of irrigated agriculture are conducted for the	Large-scale
Nitcers of Federal, Provincial, Local Governments and board members of	unseasonable
WUAS IN LEGAL ITRIGATION AREA.	weather will not
	occur.

Remarks: 4-2 and 4-3 are preparatory activities to achieve overall goal.

TCP-PIAT BASELINE SURVEY FOR SECONDARY CANAL COMMITTEE NOTE: Red font is a question related to PDM indicator

Date of Interview: Name of Respondents and Position: Telephone Number:

1. BASIC INFORMATION ON WUA-SC

Number of Secondary	No.#			
Canal Committee				
When this SC was	Specify the year:			
constructed				
When did this SC	Specify the year:			
became operational				
(distribution of water to				
the members)				
Reasons for the delay				
Members in the	Total:	Male:	Female:	
Committee				
No of Active members in	Total:	Male:	Female:	
the committee				
No. of Tertiary Canals	No of TC:	No. of Tertiary Canal		
		Committees		
Reasons for mismatch	1.			
between the number of	2.			
TC and TCCs? Select any	3.			
one				
No of Active Tertiary				
Canal Committee				
Reasons, if no of active				
TCC is less than the no				
of TCC.				
Number of Users	Area: (Approx. Irriga	ated area as per SCC	-ha	
(Current as per SCC)/	Area as per KIMO=	ha),		
Total Irrigation Area (ha)	Total users as per S	Total users as per SCC:		
	<u>1 Male() members, 2 Female() , Farms/company ()</u>			
	School/colleges- Total members=			
Type of water users	Land owner: Mer	mber: (), Area	.: () ha	
	Lease farmer: : Men	nber: (), Area	n: () ha	
	Farm/Company: : Mer	mber: (), Area	n: () ha	
	School/colleges- :Mer	nber: (), Area	:()ha	
	If farm/company, sp	ecify govt or specify	. ,	
Reasons for the				
difference between				
official (KIMO/WUA)				
area and acutally				
irrigated area				
TCs with Field Channel	(Specify TCC):			
If there is no field	(1)	are used to flood irrigatio	n	
channel, Why there is	(2) □Farmers dema	(2) Farmers demands for field channels are not responded by KIMO		
no field channel	(3) Farmers demands for field channels are not responded by			
(Reasons) Please tick	WUA/MCC			

 (4) Farmers demands for field channels are not responded by our municipal government (5) SCC users did not realize the need for the field channel (6) Water in the SC is adequate so there is no need to have FCs 			
(Specify TCC):			
(Specify TCC):			
red by the Secondary Canal	NO: Area (Ha):		
/ered by the Secondary Lanal Area (Ha):			
Why number of shallow tube wells is highest UWater distribution/supply is			
-	low/irregular		
iple responses possible)	Obstructions in the canal		
	Intensity of winter/spring crops high		
	Users aimed to avoid ISF payment		
Others, if any specify			
Ifficiency of Shallow Tube Well Water in the last Spring Season: Good Fair Po			
Winter Season: Good G Fair G Poor			
in the Secondary Canal			
number of Opstructions in the Secondary Canal Tes L No			
e.g. megai check gale, blockage by farmers II yes,			
Temporary obstruction-			
	 (4) □Farmers demands for fimunicipal government (5) □SCC users did not reali (6) □Water in the SC is aded (7) □If any specify, (Specify TCC): (Specify TCC): (Specify TCC): (Specify TCC): be Well Number and Area in ared by the Secondary Canal est number of shallow ube wells is highest iple responses possible) ube Well Water in the last in the Secondary Canal ockage by farmers 		

2. ACTIVITIES OF SCC 2.1 ACCOUNTING

AUUUUIIIIU			
Account	Bank Cooperative No account		
	No. of Signer & Position:		
Income and	Available (Soft copy, Hard copy)		
expenditure report	Non available		

Period	FY 2019-2020	FY 2020-2021		
Income	1) ISF :	1) ISF :		
	2) Others-	2) Others-		
	If others, identify	If others, identify		
Major SCC	Canal Cleaning: Rs.	Canal cleaning: Rs.		
Expenditure *Annual)	Operation: Rs.	□Operation: Rs.		
Rs-	Maintenance/Repair of irrigation	Maintenance/Repair of irrigation		
	facilities: Rs.	facilities: Rs.		
	□ Others (specify:)	□ Others (specify:)		
	Rs.	Rs.		
How many members	() members	() members		
did pay ISF?				
Annual cultivation	() members cultivated in Spring	() members cultivated in Spring		
% of current water	season	season		
users (Approx.)				

Period	FY 2019-2020	FY 2020-2021		
	() members cultivated in Winter	() members cultivated in Winter		
	season	season		
	() members cultivated in Rainy	() members cultivated in Rainy		
	season	season		
Collection Amount/	Rs	Rs		
Rate of O&M Fees if	(specify the purpose):	(specify the purpose):		
any.				
Collection Amount/	Rs/() members	Rs () members		
No. of New				
Membership Fee				
Collection Amount/	Rs. () members	Rs. /() members		
No. of Renewal Fee				

2.2 MEETING

Period	FY 2019-2020 FY 2020-2021			
Regular Meeting /	() times/ year	() times/ year		
Attendance Members	Average:	Average:		
Major Agenda in	Cultivation Plan, Irrigation Sche	dule, DWater Distribution,		
Regular Meetings	🗖 Maintenance/Repair, 🗖 WUA Fund	ds/Accounting, 🛛 Farm Inputs, 🗖		
	Marketing, D Farm Labours, D Farm Machinery,			
	□ Others (specify)			
Secondary	No. of participants (committee	No. of participants (committee		
Committee Assembly	member and farmers):	member and farmers):		
	()members	()members		
Major Agenda in	Cultivation Plan, I Irrigation Schedule, Water Distribution,			
Secondary	□ Maintenance/Repair, □ WUA Funds/Accounting, □ Farm Inputs,			
Committee Assembly	□Marketing, □ Farm Labours, □ Farm Machinery,			
(Secondary	□ Others (specify)			
assembly)				

2.3 ACTIVITY CONDUCTED BY SCC

Activity/Period	FY 2019-2020			FY 2020-2021
Preparation of	Yes	If YES, please answer	Yes	If YES, please answer
Cropping Calendar in	🛛 No	your activity in each	🛛 No	your activity in each
SCC		season.		season
		Spring season		Spring season
		Winter season		Winter season
		Rainy season		Rainy season
Preparation of Water	Yes	If YES, please answer	Yes	If YES, please answer
Distribution Plan in	□ No	your activity in each	🗆 No	your activity in each
SCC		season.		season.
		Spring season		Spring season
		Winter season		Winter season
		Rainy season		Rainy season
If no, why water	□ SCC is expecting WUA/MCC to			is expecting WUA/MCC to
distribution plan is	prepared the plan		prepare	d the plan
not prepared	SCC does not know how to		SCC does not know how to	
	prepare water distribution plan		prepare	water distribution plan
	SCC did not feel its necessity		SCC did not feel its necessity	
	□Any of	ther specfify	□Any of	ther specfify

Activity/Period		FY 2019-2020	FY 2020-2021	
Gate Operation for	No. of ga	ates:	No. of g	ates:
Tertiary Canals along	Gate Op	eration Record: No	Gate Op	peration Record: No
Secondary Canal	🛛 Availa	able (🛛 Soft copy, 🖵 Hard	Available (Soft copy, Ha	
-	copy)		copy)	
Coordination of	🛛 Yes 🗆	No, If yes,	□ Yes □ No, If yes,	
Water Allocation with	Ca	ses/times	Cases/times	
other SCCs if any	Specify	the subject-	Specify the subject-	
Coordination of		No. If ves.	Yes No. If ves.	
Water Allocation with	Cases	s/times	Cases/times	
MCC	Specify t	the subject-	 Specify the subject-	
	(Repair & Maintenance of canal &		(Repair &	Maintenance of canal &
	rotation o	f water distribution)	rotation of	of water distribution)
Sanction for	🗆 Yes 🗆	No. If ves.	🗆 Yes 🗆	No. If ves.
Diverting Water	case		cases	
Elsewhere against		varning	□Oral w	varning
Distribution Schedule	DFine (r	nonetary)		, ann ag
Distribution Constants	□Other	penalty		nenalty
	(specify)	penalty	(specify)	
If No. why the	(opcony)		(opcony)	
committee does not				
sanction to divert				
water elsewhere?				
Canal Cleaning		If VES how it is		If VES how it is
Boforo spring socon		norformed		n res, now it is
(wooding 8 docilting)				
(weeding a desiring)		members to recruit		mombors to recruit
		niembers to recruit		approactor through
		Device as applicable		Du labour participation
				Attendence Liet Da in th
		Average No. of		Average No. of
		Participants: Male ()		Participants: Male ()
		Female ()		Female ()
Canal Cleaning		If YES, now it is		If YES, now it is
Before winter season				
(weeding & desliting)				
		members to recruit		members to recruit
		contractor through		contractor through
		TCC/SCC as applicable		TCC/SCC as applicable
		By labour participation		By labour participation
		from WUA members		from WUA members
		If YES, please answer the		If YES, please answer the
		followings:		followings:
		Attendance List: Available		Attendance List: Available
		Average No. of		Average No. of
		Participants: Male ()		Participants: Male ()
		Female ()		Female ()
Canal Cleaning	🛛 Yes	If YES, how it is	🛛 Yes	If YES, how it is
Before rainly season	🛛 No	performed	🛛 No	performed
(weeding & desilting)				

Activity/Period		FY 2019-2020		FY 2020-2021
		Cash contribution by		Cash contribution by
		members to recruit		members to recruit
		contractor through		contractor through
		TCC/SCC as applicable		TCC/SCC as applicable
		By labour participation		By labour participation
		from WUA members		from WUA members
		If YES, please answer the		If YES, please answer the
		followings:		followings:
		Attendance List: Available		Attendance List: Available
		Average No. of		Average No. of
		Participants: Male ()		Participants: Male ()
		Female ()		Female ()
Greasing Gates	Yes	If YES, please answer	Yes	If YES, please answer
which is under SCC/	🗆 No	your activity in each	🛛 No	your activity in each
тсс.	🗆 No	season.	🛛 No	season.
	gate	before Spring season	gate	before Spring season
	Ū.	L before Winter season	Ū.	L before Winter season
		before Rainy season		before Rainy season
Walk-through along	🛛 Yes	Status Record: Available	🛛 Yes	Status Record: Available
Secondary Canal	🛛 No	If YES, please answer	🛛 No	If YES, please answer
		your activity in each		your activity in each
		season.		season.
		before Spring season		before Spring season
		L before Winter season		L before Winter season
		before Rainy season		before Rainy season
Walk-through along	Yes	Status Record: Available	Yes	Status Record: Available
Tertiary Canal	🗆 No	If YES, please answer	🗆 No	If YES, please answer
		your activity in each		your activity in each
		season.		season.
		before Spring season		before Spring season
		before Winter season		before Winter season
		before Rainy season		before Rainy season
Minor Repair to	Yes	Repair Record: Available	Yes	Repair Record: Available
Structures/	🗖 No	If YES, please answer	🗖 No	If YES, please answer
Rehabilitation of		your activity in each		your activity in each
Secondary Canal		season.		season.
which is conducted		before Spring season		before Spring season
by SCC official		before Winter season		before Winter season
activity (e.g.		before Rainy season		before Rainy season
expenditure of labour		specify repair details		specify details
cost, material,		()		()
contract).		(Canal bank repair, weeding		(Canal bank repair, weeding
		etc.)		etc.)
Minor Repair to	🛛 Yes	Repair Record: Available	□ Yes	Repair Record: Available
Structures/	D No	If YES, please answer	D No	If YES, please answer
Rehabilitation of	Do Do	your activity in each	🖵 Do	your activity in each
Tertiary Canal	not	season.	not	season.
which is conducted	know	before Spring season	know	before Spring season
by TCC official		□ before Winter season		□ before Winter season
activity (e.g.		before Rainy season		before Rainy season
expenditure of labour		specify repair details		specify details
				()

Activity/Period		FY 2019-2020		FY 2020-2021
cost, material,				
contract).				
Construction of Field	Yes	If YES, specify details	Yes	If YES, specify details
Channels	□ No		□ No	
Why FCs are not				
constructed in other				
TCC (Reasons)				
Hiring Agricultural	Yes	If YES, specify details	Yes	If YES, specify details
Machinery by SCC	🖵 No	Type of machine:	🛛 No	Type of machine:
for the repair and				
maintenance of the		Purpose:		Purpose:
SCCs/TCCs		Total Amount: Rs		Total Amount: Rs
Others (specify)				

3 IRRIGATION

Trend of Irrigation Water	Improving Declining Constant Do not know					
availability in the SC over						
the last 5 years						
Reasons for the response						
Sufficiency of Irrigation	Spring seas	son : 🛛 Sufficier	nt 🛛 Fair	ly sufficient	Not Sufficient	í
Water in the last 5-10 years	Winter seas	son : 🛛 Sufficier	nt 🛛 Fair	ly sufficient	Not Sufficient	i
	Rainy seas	on : DSufficien	nt 🛛 Fair	ly sufficient [Not Sufficient	•
	(Water is su	ufficient during t	the rota	ation)		
Period	FY	2019-2020		FY	2020-2021	
SCCs Irrigated Area	Area: () ha,		Area: () ha,	
Spring Season	By Canal()%, By STW()%	By Canal()%, By STW()%
If facility for canal irrigation						
is available in two						
consecutive years, please						
specify the reason (there						
sould be rotation						
irrigation).						
SCCs Irrigated Area	Area: () ha,		Area: () ha,	
Winter Season	By Canal()%, By STW()%	By Canal()%, By STW()%
SCCs Irrigated Area	Area: () ha,		Area: () ha,	
Rainy Season	By Canal()%, By STW()%	By Canal()%, By STW()%
Irrigation Facility List of	Available	∋ (❑ Soft copy,	Hard	сору)		
SCC	□Stop Log, □Division Box, □Others(Specify:)					
Facility Maintenance/	Available (Soft copy, Hard copy)					
Rehabilitation Plan	Not Available					
Gate Operation for Tertiary	Operator: Gate keepers nominated by SCC, SCC themselves					
Canals along Secondary	□ Users open by themselves □ Others (specify)					
Canal	How are gate operation carried out?					
	Base on the asking of farmers					
	Based o	n the rules set b	by SCC			
	(briefly specify the rules):					

4 AGRICULTURE

Period	FY 2019-2020	FY 2020-2021
Cultivated Area in	Spring Season in 2020	Spring Season in 2021
WUA-SC: Spring	Тор 3 Сгор	Тор 3 Сгор
Season	<u>1. </u>	<u>1. </u>
	<u>2. </u>	<u>2. </u>
	<u>3. </u>	<u>3. </u>
	Fallow Land: () ha	Fallow Land: () ha
If there is no change	Reasons:	·
in area under spring	1.	
crop during two	2.	
consecutive years,	3.	
Why there is no		
change in the area?		1
Cultivated Area in	Winter Season in 2019-20	Winter Season in 2020-21
WUA-SC: Winter	Тор 3 Сгор	Тор 3 Сгор
Season	<u>1. </u>	<u>1. </u>
	<u>2.</u> :()ha	<u>2.</u> :()ha
	<u>3.</u> :()ha	<u>3.</u> :()ha
	Fallow Land: () ha	Fallow Land: () ha
If there is no change	Reasons:	
in area under Winter	1.	
crop during two	2.	
consecutive years,	3	
Why there is no		
change in the area?		
Cultivated Area in	Rainy Season in 2019	Rainy Season in 2020
WUA-SC: Rainy	Top 3 Crop	Top 3 Crop
Season	<u>1.</u> :()ha	<u>1.</u> :()ha
	2. :() ha	2. :() ha
	<u>3.</u> :()ha	3. : () ha
De Lle Mall	Fallow Land: () ha	Fallow Land: () ha
Paddy Yield	Rainy: () ton/ha/season	Rainy: () ton/ha/season
	Spring: () ton/ha/season	Spring: () ton/ha/season

5 SERVICES / TRAINING

Avalability of	Kinds of Services	FY 2019/20	FY 2020/21
services from	Rehabilitation & Minor Repair	🛛 Yes 🗆 No	🛛 Yes 🗆 No
Municipality to SCC	Operation & Maintenance	🛛 Yes 🗆 No	🛛 Yes 🖵 No
(irrigation related)	Agriculture Machinery Hiring	🖵 Yes 🗖 No	🛛 Yes 🗆 No
	Field channel construction	🗆 Yes 🗆 No	🗆 Yes 🗆 No
	Others :	🗆 Yes 🗆 No	🗆 Yes 🗆 No
Avalability of	Input Support (Seeds,	🛛 Yes 🗆 No	🗆 Yes 🗆 No
services from	fertilizers, pesticided etc,)		
Municipality to SCC	Marketing support	🗅 Yes 🗅 No	🗆 Yes 🗆 No
(Agriculture	Demonstration of	🗆 Yes 🗆 No	🗆 Yes 🗆 No
Commercialization/Pr	new/improved technologies		
oduction increase)	Agriculture machinery (subsidy)	Yes No	🛛 Yes 🗆 No
	Community Development	🛛 Yes 🖾 No	🛛 Yes 🖾 No

	Others		Yes No	Yes No Specify:
Services from AKC to SCC	Receive agricultural support (specify) No			
Training	Trainings (last 2 years) □ Yes □ No	t 2 years) Specify: ISF collection Organiser: Number of Participants: person(s)		person(s)
		Spe Org Nur	cify: Water distribution aniser: nber of Participants:	person(s)

6. PROBLEMS RELATED TO IRRIGATED AGRICULTURE

Most serious problems faced by WUA-SC and What do you want to do? (Top Three)

What are major	1.
problems faced by	2.
WUA?	3
What should be done	1.
to solve your	2.
problems?	3
What kind of	1.
trainings you need?	2.
	3

Team's observation (Memo)



TECHNICAL COOPERATION PROJECT FOR THE PROMOTION OF IRRIGATED AGRICULTURE IN

TERAI PLAIN



DATE:

BASELINE SURVEY FOR INDIVIDUAL FARMER

NAME OF SURVEYOR: SECONDARY CANAL COMMITTEE NO: MODEL SCC- YES (1) No (2) TERTIARY CANAL COMMITTEE NO: MODEL TCC- YES (1) No (2) NAME OF PALIKA WARD NO CHECKED BY : MR RAM NARAYAN KSHETRI (1)

TOLE **MR BHUMI PRASAD KAFLE**

NOTE: Red font is a question related to PDM indicator

SECTION I. DASIC INFORMATION O			
1. Name of Respondent		Age:	
2.1. Gender:	1. Male 2. Female		
2.2 Telephone Number.:			
2.3 Education of the Respondent:	1. No Formal Education 2. Basic (Grade 1-8)3. Secondary		
	(10 pass) 4. Higher Secondary (12 pa	ass) 5. Graduation and	
	above		
2.4. Ethnicity:	1 Brahmin/ Chhetri/Thakuri/Sanyasi		
	2 Janajati		
	3 Dalit-		
	4 Other (specify):		
3. No. of Family Member	1. Under 15 (), 2. 15 to 60 (), 3. Above 60 (
)	, , , , ,	
4. Mainly engaged in Agriculture	() members		
Surveyor: An individual is said to be	1. Male ()		
engaged in agriculture when he/she	2. Female ()		
provides labour in agriculture for a			
minimum of six months, and main source			
of income is agriculture which includes			
farming, livestock keeping and fisheries.			
Please check it and record the response			
5 Name of Household head			
5.1 Gender of HH Head			
5.2 Key occupation of the HH Head	1. Agriculture		
	2. Retail shop/grocery (village)		
	3. Contractor		
	4. Service (Govt/Semi-govt/Private/N	GO/School etc.)	
	5. Remittance (Abroad)		
	6. Labour (Agriculture/Others)		
	7. Others, specify		
5.3 First three income sources of	1. First (Highest)-		
the household	2. Second highest-		
Code for the Surveyor:	Third highest-		
1)Agriculture			
2)Retail shop/grocery (village)			
3)Contractor			
4)Service (Govt/Semi-			
govt/Private/NGO/School etc.)			
5)Remittance (Abroad)			

SECTION 1 BASIC INFORMATION ON RESPONDENT

6)Labour (Agriculture/Others)	
7)Others, specify	
6. Status of Land Holding:	1. Land owner,
Surveyor: Multiple response possible	2. Land owner, Rented out (in cash) and shared to others
However, do not interview those landless	for farming
persons who have been doing	3. Leased land from others under crop sharing arrangement
businesses such as grocery shop and	but the HH is landless- no land at all under HH ownership
non-agriculture business by renting land	4 Firm/Company D Other (specify)
from others and firm refers to those	
agriculture farms which are registered	
Small Industry and/or Company Registrar	
7 Total Agricultural Land Holding	Owned by HH (1)
(Bigha and Katha) and Irrigation	Rented in/lease contract (2)
Status	Rented out/lease contract (3)
20 Katha= 1 Bigha, 1.5 Bigha=1 Ha	Peceived for share cropping (4)
20 ratha= r Digna, no Digna=r na	Received for share cropping(4)
Surveyor: Please note agriculture	$7.1 \text{ Total land: } \left((1,2,4), (2,5) \right) = (5.0) \text{ be}$
includes crop, livestock, fisheries, bee	7.1 10(d) (d) ((1+2+4)-(3+3))= (5.0) [1d
keeping etc.)	7.2 Lanu useu in agriculture= (3.0) na
Surveyor: Agriculture includes farming	7.5 Of the total land used in agriculture, land area used for
(cereals, fruits, vegetables, all types of	crops (cereals, cash crops, fruits, veg. etc):
cash crops, livestock keeping and	7.4 Of the total land used in crop (7.3), area with irrigation
fisheries etc)	facility (7.4.1+7.4.2+7.4.3):
	7.4.1 Irrigated through Kankai Irrigation System
	7.4.2 Other surface irrigation
	7.4.3 Shallow Tube well/pump Irrigation
	#
8. Location of your farm in the KIS	Head (Near water distribution point/gate in secondary
secondary canal	canal)- Area(ha):
(If you have more than one farms	☐ Mid: Area(ha)
irrigated by KIS, please provide this	🖵 Tail: Area
information for all the farms)	
Surveyor: Please note that the total	
area should not exceed data in 7.4.1)	
9. When did your HH joined as water	
user	
10. Do you know when your SCC	
began to distribute water to the	
users/farmers.	
11. If there is difference between year	1- Migrated to KIS command area
of water distribution and membership	2- Procured land located in the KIS command area
taken, give reasons .	3- Property division among brothers
	4- Other member of the HH was the member but I inherited
	5. Any other specify
12. Position in Secondary Canal	1 Chairman, 2 Vice-Chairman, 3Secretary, 🖵 4. Treasurer,
Committee	5 Member
13.Position in Tertiary Canal	1 Chairman, 2 Vice-Chairman, 3Secretary, 🛛 4. Treasurer,
Committee	5 Member
14. Member of Agricultural	1- Yes 2- No
Cooperative?	
14.1 Name, If Yes	
15. Farmer Group	1- Yes 2- No
15.1 Specify name of the farmer	-
group, if ves	
J	

2. HOUSEHOLD INCOME AND EXPENDITURE (1) Annual Household income (2020, 13 Apr-2021, 13 Apr)

		Gross Amount (RPR/year)
1. Farm incor	me (Cereal Crops)	
2. Farm incor	me (Oil seeds)	
3. Farm Incor	me (Pulses)	
4. Farm incor	me (Vegetables)	
5. Farm incor	me (others such as livestock	
fishery and	l beekeeping)	
6. Overseas	remittance	
7. Remittance	e (Domestic)	
8. Grocery/SI	nops/Business	
9. Services (Govt/Private/NGO)	
10. Social sec	urity	
11. Other inco	mes (specify)	
12. Other inco	mes (specify)	
	1. Total Income	

(2) Annual Household Expenditure

Items	Item spend Monthly (Rs.)	Items only spend Annually (Last year-Nep FY 2077) (Rs.)	
Food			
Clothing			
Health/Medical			
Education			
Utilities			
House repair and maintenance			
Irrigation Service Fee			
KIS			
Other IS			
Electricity bill for STW			
Agriculture (including Labour a	nd inputs)		
Crop		_	
Livestock			
Fisheries			
Vegetables			
Other Agri-enterprises			
Insurance			
Interest payment			
(Bank/Cooperative)			
Loan payment			
Others (specify:			
Expenditure	A	B	
Total expenditure (2)	Surveyor: A x 12+B= Total Expe	nditure= Rs.	
(3) If expenditure (2) is more	1- Borrowed from friends/neighb	ours/relatives	
than the income (1), how did	2- Credit from Bank		
you manage?	3- Credit from Cooperatives		
	4- Used saving		
	5- Otner, specify		
Lies your family			
Has your family	U Decreased by -Rs.		
experienced income effect	No change		
due to COVID-19 over the	Increased by +Rs.		
last year?			

Farm income (Oil Seeds)
□Farm Income (Pulses)
□ Farm income (Vegetables)
Farm income (Others such as livestock fishery and beekeeping)
□Overseas remittance
□Other incomes (specify)

(3) Household Dietary Diversity and effect of Covid-19

1. Household Dietary Diversity: What your family have eaten during the day and at night yesterday?

	QUESTIONS	Previous 24 hours
Α	Any bread, rice, noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat, or buckwheat?	□ Yes □ No
В	Any potatoes, yams, any other foods made from roots or tubers?	□ Yes □ No
С	Any vegetables?	🗅 Yes 🗅 No
D	Any fruits?	🗅 Yes 🗅 No
E	Any goat, pork, lamb, duck, or other birds, liver, kidney, heart, or other organ meats?	□ Yes □ No
F	Any eggs?	🗅 Yes 🗅 No
G	Any fresh or dried fish or shellfish?	🗅 Yes 🗅 No
Н	Any foods made from beans, peas, lentils, or nuts?	🗅 Yes 🗅 No
I	Any cheese, yoghurt, milk or other milk products?	🗅 Yes 🗅 No
J	Oil/Ghee/Butter (Added to food or used for cooking)	🗅 Yes 🗅 No
Κ	Any sugar or honey?(Direct)	🗅 Yes 🗅 No
L	Any other foods, such as condiments, coffee, tea?	🗅 Yes 🗅 No

(2) Household Dietary Diversity: How often are your family used to eat the following food items in August 2019 (nearly 2 years ago, 2076 Shrawan) and current August 2021 (Shrawan 2078), in one year that is after the emergence of COVID-19.

<Responses>

1- Daily; 2- 1-2 times a week; 3- Almost fortnightly; 4- Once a month; 5- Rarely

QUESTIONS	Current (2021 August)	Almost 2 years ago (2019)	Remark (Non- applicable) *
A. Any bread, rice, noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat, or buckwheat? (Please enter 1 to 5 number)			
B. Any potatoes, yams, any other foods made from roots or tubers? Please enter 1 to 5 number			
C. Any vegetables? Please enter 1 to 5 number			
D. Any fruits? Please enter 1 to 5 number			
E. Any goat, pork, lamb, duck, or other birds, liver, kidney, heart, or other organ meats? (Please enter 1 to 5 number, or 0)			
F. Any eggs? (Please enter 1 to 5 number, or 0)			
G. Any fresh or dried fish or shellfish? (Please enter 1 to 5 number or 0)			
H. Any foods made from beans, peas, lentils, or nuts? (Please enter 1 to 5 number)			

I.	Any cheese, yoghurt, milk or other milk		
	products? (Please enter 1 to 5 humber)		
J.	Oil/Ghee/Butter (Added to food or used for		
	cooking) (Please enter 1 to 5 number)		
K.	Any sugar or honey?(Direct) (Please enter 1		
	to 5 number)		
L.	Any other foods, such as condiments, coffee, tea? (Please enter 1 to 5 number)		

*- Non applicable for vegetarian HHs (E, F, G- non-veg products.)

(2) Livelihood Strategy: Over the last one year after COVID-19 emergence, did anyone in your household have to engage in any following behaviours due to a lack of food or a lack of money to buy food?

<Response> Yes or No) If No, respondents are required to clarify, 1 = No, because it wasn't necessary 3 = Not applicable,

QUESTIONS			2	.No
		1. Yes	2. No, Not Necessary	3. No, Not applicable
A	Sold household assets/goods (radio, furniture, refrigerator, television, jewellery etc			
В	Reduced non-food expenses on health (including drugs) and education			
С	Sold productive assets or means of transport (sewing machine, wheelbarrow, bicycle, car, etc)			
D	Spent savings			
E	Borrowed money / food from a formal lender / bank			
F	Sold house or land			
G	Withdrew children from school			
н	Sold last female animals			
I	Sold more animals (non- productive) than usual			

4. WATER MANAGEMENT AND MAINTENANCE OF IRRIGATION FACILITIES

	Irrigation Service	Fee (ISF)	O&M Fee	e
FY 2019/2020	Paid (Rs.)	Paid (Rs.)
(Nepali FY	Not Paid		Not Paid	
2076/77)	If not paid, reason:		If not paid, reason:	
FY 2018/2019	Paid (Rs.)	Paid (Rs.)
(Nepali FY	Not Paid		Not Paid	
2075/76)	If not paid, reason:		If not paid, reason:	
Reasons when	1.			
there is no	2.			
difference in ISF	3.			
amount paid over				
the last two				
consecutive years				

(1) Payment of service fee (Kankai WUA)

(2) Annual Irrigated Area/ Availability of Irrigation Water

Have you prepared	cropping calendar in advance and utilised last year?	🗅 Yes, 🗅 No					
Do you know water	distribution plan by seasons which should be	🛛 Yes, 🖵 No					
prepared before the	prepared before the cultivation (irrigation schedule)?						
Have you prepared	Have you prepared and utilized water distribution plan by seasons						
(irrigation schedule)?						
Spring season (Irrigated Area from Kankai Canal: () ha						
2021 Jan 15-May	More than adequate, Adequate, Not adequate, A	Not water at all					
15)	Reason of Not enough/ No water:						
	Irrigated Area from Shallow Tube Well: () ha						
Winter season	Irrigated Area from Kankai Canal: () ha						
(2020 Sep 15-	More than adequate, Adequate, Not adequate, A	Not water at all					
2021 Jan 15)	Reason of Not enough/ No water:						
	Irrigated Area from Shallow Tube Well: () ha						
Rainy season	Irrigated Area from Kankai Canal: () ha						
(2021 May 15-Sep	More than adequate, Adequate, Not adequate, A	Not water at all					
15)	Reason of Not enough/ No water:						
	Irrigated Area from Shallow Tube Well: () ha						
Have your family	Decreased, No change Increased						
changed irrigated	Which season is decreased or increased?						
area due to	Spring Season: () ha						
COVID-19?	Winter Season: () ha						
	Rainy Season: () ha						

(3) O&M of Irrigation facilities

Do you know fa	cility maintenance plan prepared by your SCC/TCC?					
Spring season	A. Tertiary canal cleaning (desilting)					
(2021 Jan 15-	1. Yes					
May 15)	2. Don't know					
	2.1 : If you don't know, why ?					
	B. Greasing gates					
	1. Yes					
	2. Don't know					
	2.1 : If you don't know, why ?					
	C. Repair to embankment					
	1. Yes					
	2. Don't know					
	2.1 : If you don't know, why ?					

	D. Repair to structure
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
	E. Tertiary canal cleaning (weeding)
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
Winter season	A. Tertiary canal cleaning (desilting)
(2020 Sep 15-	1. Yes
2021 Jan 15)	2. Don't know
	2.1 : If you don't know, why ?
	B. Greasing gates
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
	C. Repair to embankment
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
	D. Repair to structure
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
	E. Tertiary canal cleaning (weeding)
	2. Don't know
Doiny coocon	2.1. If you don't know, why ?
Kainy season	A. Tertiary canal cleaning (desitting)
(2021 Way 15-	1. Tes
Sep 15)	2.1 · If you don't know why 2
	B. Greasing gates
	1 Vac
	2 Don't know
	2.1 · If you don't know why?
	C. Renair to embankment
	1 Yes
	2 Don't know
	2.1 · If you don't know why?
	D. Repair to structure
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
	E. Tertiary canal cleaning (weeding)
	1. Yes
	2. Don't know
	2.1 : If you don't know, why ?
	•

Have you reduce	ced the participation in O&M activities in FY	🛛 Yes, 🖵 No
2020/2021 due	to COVID-19?	
If YES, please a		

Rainy season	No If "No", Reason:						
(2021 May 15-	2.Tertiary canal cleaning (weeding) - Yes-1, No-2						
Sep 15)	No If "No", Reason:						
	3.Tertiary canal cleaning (desilting) - Yes-1, No-2						
	No If "No", Reason:						
	4.Greasing gates - Yes-1, No-2 No If "No", Reason:						
	No If "No", Reason: 5.Repair to embankment- Yes-1, No-2						
	5.Repair to embankment- Yes-1, No-2						
	No If "No", Reason:						
	6.Repair to structure- Yes-1, No-2						
	No If "No", Reason:						
	7.No involvement in any activities						
	Reasons:						
B Spring	1. Water distribution from tertiary canal- Yes-1, No-2						
season (2021	No If "No", Reason:						
Jan 15-May	2.Tertiary canal cleaning (weeding) - Yes-1, No-2						
15)	No If "No", Reason:						
	3.Tertiary canal cleaning (desilting) - Yes-1, No-2						
	No If "No", Reason:						
	4.Greasing gates- Yes-1, No-2						
	No if "No", Reason:						
	5.Repair to embankment - Yes-1, No-2						
	No if "No", Reason:						
	6.Repair to structure - Yes-1, NO-2						
	No II No , Reason:						
	7.No involvement in any activities						
Winter season	1 Water distribution from tertiary canal. Voc 1 No 2						
(2020 Son 15-	No If "No" Reason:						
(2020 Sep 13-	2 Tertiary canal cleaning (weeding) - Ves-1 No-2						
2021 0011 13)	No If "No" Reason:						
	3 Tertiary canal cleaning (desilting) - Yes-1 No-2						
	No If "No" Reason						
	4.Greasing gates- Yes-1 No-2						
	No If "No". Reason:						
	5.Repair to embankment- Yes-1, No-2						
	No If "No". Reason:						
	6.Repair to structure- Yes-1, No-2						
	No If "No", Reason:						
	7.No involvement in any activities						
	Reasons:						

4. AGRICULTURE PRODUCTION

(SURVEYOR: RECORD AREA UNDER CROP – SEE SECTION 1 RESPONSE TO Q. 7.3) (1) Please give information on production and sales of the following crops

			Cultivati	ng Period	Cultivate	Productio	Sale	
Cultivatio n Season	Major Crop (Top Three)	Top Variety	From (Sowing) (Month)	To (Harvestin g) (Month)	d Area (Bigha/K atha)	n quantity (kg/seaso n)	quantity (kg/seaso n)	Sale Price (Rs./kg)
Spring								
season ((2)							
2021 Jan	(3)							
15-May								
15)								
winter								
season (2020								
(2020 Sen 15-								
2021 .lan								
15)								
Rainy	(1)							
season	2							
(2021	3							
May 15-								
Sep 15)								
2.Provide re	easons if the amount so	ld is more than the pro	duction of any	crops listed at	ove, specify	ing the crops	and seasons	
1								
2								
3								
3 Provide re	3 Provide reasons if the average vield is substantially lower than the overall average vield of any crops listed above, specifying the crops							
and season	and seasons?							
1	1							
2								
3								

Did you ch	Did you change crop/vegetable cultivation in FY 2020/2021 because of COVID-19?							
If YES, plea	ase answer the following	ng question						
Cultivati on	Major Crop	Variety changed	Cultivatin		Cultivate d Area (Katha)	Production quantity (kg/season)	Sale quantity (kg/season)	Sale Price (Rs./kg)
Season	(Top Thee)		From (Month)	To (Month)			□ No tion Sale quantity son) (kg/season) (l	
Spring	1							
season ((2)							
2021 Jan	(3)							
15-May								
15)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
Winter								
season	(2)							
(2020	(3)							
Sep 15-								
2021 Jan								
15)								
Rainy	(1)							
season	2							
(2021	(3)							
May 15-								
Sep 15)								

(2) Please give information on inputs for production

Cultivation	Major Crop				Agriculture	e Input (If Ye	s, please ch	eck ✔)	
Season	(Top Three)	l op Variety	Purchased Seed	Irrigation Water	Chemical Fertiliser	Organic Manure	Pesticid e	Fungicide	Labour hired from outside
Spring									
season (2								
2021 Jan	3								
15-May 15)									
Winter									
season	2								
(2020 Sep	3								

15- 2021					
Jan 15)					
Rainy					
season	2				
(2021 May	3				
15-Sep 15)					

Did you changed agricultural input in FY 2020/2021 due to COVID-19?

If YES, please answer the following question

		ning question							
Cultivation	Major Crop					Agricultur	e Input		
Season	(Top Three)	Variety changed	Purch- ased Seed	Irrigation Water	Chemical Fertiliser	Organic Manure	Pesti- cide	Fungicide	Labour hired from outside
Spring									
season (2								
2021 Jan 15-May 15)	3								
Winter									
season	2								
(2020 Sep 15- 2021 Jan 15)	3								
Rainy	1								
season	2								
(2021 May 15-Sep 15)	3								

6 Market information

1) Where did you sell your Cereal Crop in the last year?, If sold (multi-selection allowed)	 Farmgate House, Village market, Roadsi Town/City market Damak market, Birtamod Mar district Outside Province, Outside Nepal No surplus amount for sale/consumed by HHs 	de market, □ ket □ Outside						
2) Where did you sell your vegetable in the last year? If sold (multi-selection allowed)	 □ Farmgate □ House, □ Village market, □ Roadsi Town/City market □ Damak market, □ Birtamod Mar district □ Outside Province, □ Outside Nepal □ No surplus amount for sale/consumed by HHs 	de market, ❑ ket ❑ Outside						
3) How did you decide when to start plantation in the last year?	 Considering when the price/ market demand gets h Considering traditional festival, Follow neighbourhood cultivation Others (specify): 	nigh,						
To whom you sold your cereal products last year?	 Middleman/Collector, Consumer, Retailer, Processing firm, Others (specify): 	Wholesaler, 🗅						
4.To whom you sold your vegetable products last year?	 ☐ Middleman/Collector, ☐ Consumer, ☐ Retailer, ☐ Processing firm, ☐ Others (specify): 	Wholesaler, 🗅						
5) How did you transport products if you sale in the last year?	 On foot, Collected by middleman/collector, Ca Truck/pick-up van, Three-wheeler, Motorcycle, Others (specify): 	art, 🗅						
 6) Constraints on marketing? (Mark only top three) Low price, Price fluctuation, Lack of market information, Limited buyer, Difficult market access, Lack of knowledge on marketing was price fluctuation facilities. Others (specify): 								
7) Have you prepared agricul	ture business plan based on the market information?	Yes No						
7.1 If no, why you did not pre	pared#A							
7.2 If yes, was it useful to you	u?							

(8) Market price information

Do you collect market price information? (Yes / No) If "Yes", how do you collect information? [Multiple answers allowed but top/most important three only 1

oniyj		
Neighbours/Relatives	Radio FM	Shops in village
Mobile Phone	Newspaper	Trader/ Retailers in market
U TV	Trader coming to village	Government officials/ Extension officer
□Others (specify):	□Others (specify):	□Others (specify):

6. SERVICES PROVIDED BY GOVERNMENT

What kind of services reg agencies/organization in	garding irrigation and agricult the last two years ?	ure did you	u received from
		Services/	Support
Services from Municipality to you	Rehabilitation & Minor Repair of canal	1.Yes 2. No	If yes, specify:
	Operation & Maintenance	1.Yes 2. No	If yes, specify:
	Farmer group	1.Yes	If yes, specify:
	organization/mobilization	2. No	
	Delivery of subsidized	1.Yes	If yes, specify:
	farm inputs (seeds,	2. No	
	Diagnosis support on	1 Voc	If yes, specify:
	production related	2. No	
	problems at site		
	Delivery of subsidized	1.Yes	If yes, specify:
	agricultural machinery	2. No	
	Marketing support	1.Yes	If yes, specify:
AKC	Do you know AKC agricultu	ral knowle	dae centre?
(Previous DADO)	1.Yes (Just heard)		
	2. Participated in Program	conducted	by AKC (specify)
	3.No		
Private extension	1. Have you received any e	extension a	dvisory services from any of the
services (Agro-vet,	following (Yes/No)		
farms expert)	(a) Agricultural cooper (b) Agro-vets 1 Yes 2	Allves/SFA	IC 1. Yes, 2. NO
idinis, expert j	(c) Private farm 1. Yes	s. 2. No	
	(d) Freelance experts	1. Yes, 2. I	No
	(e) Neighbours 🖵 Yes	, 🖵 No	
	2- If yes, in any of the four	questions a	above, please specify what services
	you have taken from them		
	Cooperatives:		
	Agro-veis: Private farms:		
	Freelance experts:		
	Neighbours:		
Access to	1. Have you visited any ag	ricultural re	esearch farms/stations over the last
Agricultural Research	1 Ves	advices an	
	2. No		
	2. If yes, when did you visi	ted? (Spec	ify)
	3. Number of times visited	? (Specify)	
	4. Purpose of visit (Specify	/)	
	5. Has any NARC scientist	t visited you	ur farm for research purpose over
	the last one year?	es, ⊔ No	100 (D 11)
Training	6. If yes, what was the pur	pose of vis	it? (Specify)
Training		Specify:	r:
	trainings on agriculture	Number	of Participants: person(s)
	over the last two years ? (Specify:	

1.Yes	2. No	Organiser:	
		Number of Participants:	person(s)
		Specify:	
		Organiser:	
		Number of Participants:	person(s)

*****Your answer will remain confidential and will never be used anywhere except in the study's ****

*****THANK YOU VERY MUCH FOR YOUR COOPERATION *****

Memo Space

Attachment 6.2 Supplemental Data of the Survey on Individual Farmer

1 Introduction and Survey Method

SCC	Gauradaha	a (n=8	37)	Gauriganj	(n=57	')	Kamal (n=	35)		Shivasataks	hi (n=1:	55)	Total	(n=334)
See	SCC	No	(%)	SCC	No	(%)	SCC	No	(%)	SCC	No	(%)	No	(%)
Model TCC	SCC17, TC2	10	11.5	SCC 10, TC11	10	17.5	SCC15, TCC10/11	10	28. 6	SCC 1, TCC6	10	6.5	40	12
Model SCC	SCC 17 other than TCC 2	7	8	SCC 10 other than TCC 10	2	3.5	SCC 15 other than TCC10/11	6	17. 1	SCC 1 Other than TC 6 +SCC 10 other than TCC 10	10	6.5	25	7.5
Non Model	SCC 16, 18, 19, 20, 21	70	80.5	SCC 7, 8, 11, 12	45	78.9	SCC 14, 16	19	54. 3	SCC 0, 2, 3, 4, 5, 6, 7, 8, 9, 13	135	87.1	269	80.5
Total		87	100		57	100		35	100		155	100	334	100

 Table 1.1-1
 Models SCC and TCCs by Municipality

Source: JICA Project Team

Table 1.1-2 Location of Respondents by SCC

		Head			Mid			Tail		T (1			Head			Mid			Tail		T (1
SCC No	No	Area (ha)	(%)	No	Area (ha)	(%)	No	Area (ha)	(%)	l otal No	SCC No	No	Area (ha)	(%)	No	Area (ha)	(%)	No	Area (ha)	(%)	l otal No
SCC 0	5	2.53	32.9	5	2.23	29.0	5	2.94	38.2	7.7	SCC 11	7	5.33	22.8	5	10.40	44.4	8	7.68	32.8	23.4
SCC 1	2	1.70	15.3	12	7.93	71.5	2	1.46	13.1	11.1	SCC 12	5	12.80	50.5	5	4.37	17.3	6	8.16	32.2	25.3
Model TCC	0	0.00		10	6.77		0	0.00			SCC 13	3	0.62	7.2	9	6.03	69.7	3	2.00	23.1	8.7
Others	2	1.70		2	1.16		2	1.46			SCC 14	7	5.06	57.4	5	2.95	33.5	2	0.80	9.1	8.8
SCC 2	5	2.70	23.8	5	3.80	33.4	5	4.87	42.8	11.4	SCC 15	2	1.07	8.3	7	7.73	60.1	8	4.06	31.6	12.9
SCC 3	5	3.17	40.6	5	3.07	39.3	5	1.57	20.1	7.8	Model TCC	1	0.40		4	4.16		5	2.86		
SCC 4	8	4.23	39.6	6	6.04	56.6	1	0.40	3.8	10.7	Others	1	0.67		3	3.57		3	1.20		
SCC 5	8	4.78	50.4	7	3.90	41.1	2	0.80	8.4	9.5	SCC 16	1	2.17	12.5	10	9.80	56.7	5	5.33	30.8	17.3
SCC 6	9	8.97	48.5	6	6.58	35.6	3	2.93	15.9	18.5	SCC 17	9	6.40	41.4	6	7.60	49.1	2	1.47	9.5	15.5
SCC 7	8	6.92	46.4	6	5.17	34.7	4	2.83	19.0	14.9	Model TCC	9	6.40		0	0.00		2	1.47		
SCC 8	12	9.78	66.6	7	4.90	33.4	0	0.00	0.00	14.7	Others	0	0.00		6	7.60		0	0.00		

		Head			Mid			Tail		T (1			Head			Mid			Tail		T ()
SCC No	No	Area (ha)	(%)	No	Area (ha)	(%)	No	Area (ha)	(%)	No	SCC No	No	Area (ha)	(%)	No	Area (ha)	(%)	No	Area (ha)	(%)	No
SCC 9	10	8.65	64.1	0	0.00	0.00	5	4.84	35.9	13.5	SCC 18	7	11.10	41.6	4	2.50	9.4	6	13.07	49.0	26.7
SCC 10	2	3.00	15.3	5	3.24	16.5	12	13.40	68.2	19.6	SCC 19	5	1.40	10.8	1	2.00	15.4	9	9.56	73.8	13.0
Model TCC	0	0.00		3	2.01		10	12.27			SCC 20	2	1.40	6.9	9	12.98	63.9	5	5.94	29.2	20.3
Others	2	3.00		2	1.23		2	1.13			SCC 21	0	0.00	0.00	9	19.53	63.0	7	11.47	37.0	31.0
Total	122	103.8	30.3	134	132.8	38.8	105	105.6	30.9	342.1											

Source: JICA Project Team

2 Basic Information on Respondent

2.1 Socio-economic Characteristic

	Gaurada	ha (n=87)	Gauriga	nj (n=57)	Kamal	(n=35)	Shivasataks	hi (n=155)	Total (n=334)		
	No of Household Head	Percentage (%)	No of Household Head	Percentage (%)	No of Household Head	Percentage (%)	No of Household Head	Percentage (%)	No of Household Head	Percentage (%)	
Male	83.0	95%	53.0	93%	32.0	91%	139.0	90%	307.0	92%	
Female	4.0	5%	4.0	7%	3.0	9%	16.0	10%	27.0	8%	

Table 2.1-1 Gender of Household Head

Source: JICA Project Team

Table 2.1-2 Respondent Position in SCC and TCC

		Gauradaha	a (n=87)	Gaurigan	j (n=57)	Kamal	(n=35)	Shivasataks	hi (n=155)	Total (n=334)
		Number of Responden t	Percenta ge (%)	Number of Responde nt	Percenta ge (%)	Number of Responde nt	Percentag e (%)	Number of Responde nt	Percentag e (%)	Number of Responde nt	Percentage (%)
Position in	Chairman	0	0.0	1	1.8	0	0.0	0	0.0	1	0.3
Secondary	Vice-Chairman	0	0.0	0	0.0	2	5.7	0	0.0	2	0.6
Canal	Secretary	2	2.3	0	0.0	1	2.9	0	0.0	3	0.9
Committee	Treasurer	1	1.1	0	0.0	0	0.0	1	0.6	2	0.6
	Executive Member	9	10.3	6	10.5	2	5.7	3	1.9	20	6.0
	Chairman	4	4.6	2	3.5	3	8.6	8	5.2	17	5.1

		Gauradaha	a (n=87)	Gaurigan	ıj (n=57)	Kamal	(n=35)	Shivasataks	hi (n=155)	Total (n=334)		
		Number of Responden t	Percenta ge (%)	Number of Responde nt	Percenta ge (%)	Number of Responde nt	Percentag e (%)	Number of Responde nt	Percentag e (%)	Number of Responde nt	Percentage (%)	
	Vice-Chairman	3	3.4	0	0.0	2	5.7	0	0.0	5	1.5	
Position in	Secretary	6	6.9	1	1.8	2	5.7	6	3.9	15	4.5	
Tertiary Canal	Treasurer	2	2.3	0	0.0	0	0.0	2	1.3	4	1.2	
Committee	Executive Member	10	11.5	4	7.0	7	20.0	16	10.3	37	11.1	

Source: JICA Project Team

2.2 Average Number of Family Member

	Under 15	Years of	15 to 60	Years of	Above 60	Years of	,		Under 15	Years of	15 to 60	Years of	Above 60) Years of	
SCC No.	Averag e Number	Percenta ge (%)	Averag e Numbe r	Percen tage (%)	Average Number	Percen tage (%)	Total	SCC No.	Averag e Number	Percent age (%)	Averag e Number	Percent age (%)	Averag e Number	Percent age (%)	Total
SCC 0	0.6	12.9	3.3	70.0	0.8	17.1	4.7	SCC 11	0.7	16.2	3.1	69.1	0.7	14.7	7.1
SCC 1	0.7	13.6	3.8	75.3	0.6	11.1	5.1	SCC 12	2.0	28.3	4.3	60.4	0.8	11.3	5.4
Model TCC	0.4	8.2	4.0	81.6	0.5	10.2	4.9	SCC 13	1.0	18.5	3.8	70.4	0.6	11.1	5.2
Others	1.2	21.9	3.5	65.6	0.7	12.5	5.3	SCC 14	1.2	23.3	3.6	68.5	0.4	8.2	5.1
SCC 2	1.2	21.7	3.5	62.7	0.9	15.7	5.5	SCC 15	0.8	16.1	3.6	71.3	0.6	12.6	4.8
SCC 3	1.1	19.0	3.9	69.0	0.7	11.9	5.6	Model TCC	0.8	16.7	3.3	68.8	0.7	14.6	5.6
SCC 4	0.9	18.2	3.7	71.4	0.5	10.4	5.1	Others	0.9	15.4	4.1	74.4	0.6	10.3	5.6
SCC 5	0.1	1.4	1.3	27.0	3.5	71.6	4.9	SCC 16	1.1	20.2	3.6	64.3	0.9	15.5	5.7
SCC 6	0.7	13.6	3.0	55.6	1.7	30.9	5.4	SCC 17	1.1	19.8	3.3	58.2	1.3	22.0	5.3
SCC 7	0.7	15.9	3.0	65.2	0.9	18.8	4.6	Model TCC	1.0	18.9	3.2	60.4	1.1	20.8	6.3
SCC 8	0.8	15.4	3.5	66.7	0.9	17.9	5.2	Others	1.3	21.1	3.5	55.3	1.5	23.7	6.4
SCC 9	0.7	14.1	3.3	69.0	0.8	16.9	4.7	SCC 18	1.1	17.7	4.6	71.9	0.7	10.4	5.7

 Table 2.2-1
 Average Number of Total Family Members

	Under 15	5 Years of	15 to 60	Years of	Above 60	Years of			Under 15	Years of	15 to 60	Years of	Above 60) Years of	
	A	ge	Ag	ge	Ag	e			A	ge	A	ge	A	ge	
SCC No.	Averag e Number	Percenta ge (%)	Averag e Numbe r	Percen tage (%)	Average Number	Percen tage (%)	Total	SCC No.	Averag e Number	Percent age (%)	Averag e Number	Percent age (%)	Averag e Number	Percent age (%)	Total
SCC 10	1.1	19.8	3.4	60.4	1.1	19.8	5.7	SCC 19	1.1	19.8	3.6	62.8	1.0	17.4	5.5
Model	1.6	25.8	3.8	61.3	0.8	12.9	6.2	SCC 20	1.1	20.5	2.9	53.0	1.5	26.5	4.5
TCC															
Others	0.3	6.9	2.8	58.6	1.7	34.5	4.8	SCC 21	0.5	10.3	2.3	50.0	1.8	39.7	5.3
Total	0.9	17.5	3.4	63.4	1.0	19.2	4.5								

 Table 2.2-2
 Average Number of Family Members who are Engaged in Agriculture by SCC

	Ma	ale	Fen	nale	То	tal		Ma	ale	Fen	nale	Тс	otal
SCC No.	Average	Percenta	Average	Average	Percenta	Average	SCC No.	Average	Percenta	Average	Percenta	Average	Percentag
	Number	ge (%)	Number	Number	ge (%)	Number		Number	ge (%)	Number	ge (%)	Number	e (%)
SCC 0	0.9	20.0	1.4	30.0	2.3	50.0	SCC 11	0.7	16.2	1.3	27.9	2.0	44.1
SCC 1	0.9	18.5	1.3	25.9	2.3	44.4	SCC 12	1.6	22.6	1.8	25.5	3.4	48.1
Model	0.9	18.4	1.3	26.5	2.2	44.9	SCC 13	1.5	28.4	1.3	24.7	2.9	53.1
TCC													
Others	1.0	18.8	1.3	25.0	2.3	43.8	SCC 14	1.1	20.5	1.5	28.8	2.6	49.3
SCC 2	1.0	18.1	1.5	27.7	2.5	45.8	SCC 15	1.1	21.8	1.5	28.7	2.6	50.6
SCC 3	0.8	14.3	1.1	20.2	1.9	34.5	Model	0.9	18.8	1.3	27.1	2.2	45.8
							TCC						
SCC 4	1.1	20.8	1.2	23.4	2.3	44.2	Others	1.4	25.6	1.7	30.8	3.1	56.4
SCC 5	1.1	21.6	1.6	32.4	2.7	54.1	SCC 16	1.1	19.0	1.5	26.2	2.5	45.2
SCC 6	1.6	29.6	1.9	35.8	3.5	65.4	SCC 17	0.9	15.4	1.3	22.0	2.1	37.4
SCC 7	1.5	31.9	1.5	31.9	2.9	63.8	Model	0.8	15.1	1.2	22.6	2.0	37.7
							TCC						
SCC 8	1.5	29.5	1.7	33.3	3.3	62.8	Others	1.0	15.8	1.3	21.1	2.3	36.8
SCC 9	0.9	19.7	1.3	28.2	2.3	47.9	SCC 18	1.1	16.7	1.5	22.9	2.5	39.6
SCC 10	1.6	27.5	1.3	23.1	2.9	50.5	SCC 19	1.1	19.8	1.3	22.1	2.4	41.9
Model	1.7	27.4	1.4	22.6	3.1	50.0	SCC 20	1.3	24.1	1.3	22.9	2.6	47.0
TCC													
Others	1.3	27.6	1.2	24.1	2.5	51.7	SCC 21	1.3	29.4	1.1	25.0	2.5	54.4

	М	ale	Fen	nale	То	tal		M	ale	Fen	nale	Тс	otal
SCC No.	Average	Percenta	Average	Average	Percenta	Average	SCC No.	Average	Percenta	Average	Percenta	Average	Percentag
	Number	ge (%)	Number	Number	ge (%)	Number		Number	ge (%)	Number	ge (%)	Number	e (%)
Total	1.2	21.9	1.4	26.5	2.6	48.5							

Note: Percentage means Average Number of Family Member who are Engaged in Agriculture / Average Number of Total Family Member Source: JICA Project Team

2.3 Occupation

	I UDIC IIC I		coupation o	I IIOusenio	a meaa sy					
	Gauradah	ia (n=87)	Gaurigan	ıj (n=57)	Kamal	(n=35)	Shivasataks	shi (n=155)	Total (1	n=334)
	Number		Number		Number		Number		Number	
Occupation	of	Percenta	of	Percenta	of	Percenta	of	Percenta	of	Percenta
	Responde	ge (%)	Responde	ge (%)	Responde	ge (%)	Responde	ge (%)	Responde	ge (%)
	nt		nt		nt		nt		nt	
Agriculture	74	85.1	54	94.7	29	82.9	134	86.5	291	87.1
Retail shop/grocery (village)	1	1.1	1	1.8	0	0.0	3	1.9	5	1.5
Contractor	0	0.0	0	0.0	0	0.0	4	2.6	4	1.2
Service (Govt/Semi-										
govt/Private/NGO/School etc.)	3	3.4	2	3.5	1	2.9	4	2.6	10	3.0
Remittance (Abroad)	4	4.6	0	0.0	1	2.9	3	1.9	8	2.4
Labour (Agriculture/Others)	0	0.0	0	0.0	1	2.9	0	0.0	1	0.3
Auto driver	0	0.0	0	0.0	1	2.9	3	1.9	4	1.2
Others, specify	5	5.7	0	0.0	2	5.7	4	2.6	11	3.3
Total	87	100.0	57	100.0	35	100.0	155	100.0	334	100.0

Table 2.3-1 Main Occupation of Household Head by Municipality

Note: Others includes: Old age -9, Priest-1, Disable -1

Table 2.3-2	First Income	Source of	Househo	ld by SCC
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SCC No	Agric	ulture	Retail sho	p/grocery	Contr	ractor	Ser	vice	Remittanc	e (Abroad)	Lab	our	Total
SCC NO	No	%	No	%	No	%	No	%	No	%	No	%	No
SCC 0	7	46.7	1	6.7	1	6.7	4	26.7	2	13.3	0	0	15
SCC 1	5	31.3	1	6.3	1	6.3	2	12.5	7	43.8	0	0	16
Model TCC	1	11.1	0	0.0	1	11.1	2	22.2	5	55.6	0	0	9
Others	4	66.7	0	0.0	0	0	0	0	2	33.3	0	0	6
SCC 2	5	33.3	2	13.3	0	0	3	20	5	33.3	0	0	15

SCC No	Agric	ulture	Retail sho	p/grocery	Contr	actor	Ser	vice	Remittance	e (Abroad)	Lab	our	Total
SCC NO	No	%	No	%	No	%	No	%	No	%	No	%	No
SCC 3	7	46.7	0	0	1	6.7	6	40	0	0	1	6.7	15
SCC 4	13	86.7	0	0	0	0	2	13.3	0	0	0	0	15
SCC 5	15	100	0	0	0	0	0	0	0	0	0	0	15
SCC 6	15	100	0	0	0	0	0	0	0	0	0	0	15
SCC 7	15	100	0	0	0	0	0	0	0	0	0	0	15
SCC 8	15	100	0	0	0	0	0	0	0	0	0	0	15
SCC 9	7	46.7	2	13.3	0	0	4	26.7	2	13.3	0	0	15
SCC 10	12	75	1	6.3	0	0	0	0	3	18.8	0	0	16
Model TCC	8	80.0	1	10.0	0	0	0	0	1	10.0	0	0	10
Others	4	66.7	0	0	0	0	0	0	2	33.3	0	0	6
SCC 11	5	33.3	1	6.7	1	6.7	4	26.7	1	6.7	3	20	15
SCC 12	10	66.7	1	6.7	1	6.7	0	0	3	20	0	0	15
SCC 13	9	60	0	0	3	20	0	0	3	20	0	0	15
SCC 14	11	78.6	0	0	0	0	0	0	2	14.3	1	7.1	14
SCC 15	17	100	0	0	0	0	0	0	0	0	0	0	17
Model TCC	10	100.0	0	0	0	0	0	0.0	0	0	0	0	10
Others	7	100.0	0	0	0	0	0	0.0	0	0	0	0	7
SCC 16	12	80	0	0	0	0	0	0	3	20	0	0	15
SCC 17	13	81.3	0	0	1	6.3	1	6.3	1	6.3	0	0	16
Model TCC	7	70.0	0	0	1	10.0	1	10.0	1	10.0	0	0	10
Others	6	100.0	0	0	0	0	0	0	0	0	0	0	6
SCC 18	13	86.7	0	0	0	0	1	6.7	1	6.7	0	0	15
SCC 19	13	86.7	0	0	0	0	0	0	2	13.3	0	0	15
SCC 20	13	86.7	1	6.7	0	0	0	0	1	6.7	0	0	15
SCC 21	14	93.3	0	0	0	0	1	6.7	0	0	0	0	15
Total	246	73.7	10	3	9	2.7	28	8.4	36	10.8	5	1.5	334

2.4 Landownership and Average Land Holding

	Land	owner	Land	owner,	Lease	d land	Firm/C	Compa		SCC	Land	owner	Land of	owner,	Lease	d land	Firm/C	Compan	
SCC	Duna	0 11 1101	Rente	ed out	from	others	n	у	Total	500	Dung		Rente	ed out	from	others		y	Total
	No	%	No	%	No	%	No	%			No	%	No	%	No	%	No	%	
SCC 0	15	100.0	1	6.7	1	6.7	0	0.0	15	SCC 11	15	100.0	0	0.0	0	0.0	0	0.0	15
SCC 1	16	100.0	1	6.3	4	25.0	0	0.0	16	SCC 12	13	86.7	0	0.0	2	13.3	0	0.0	15
Model TCC	10		1		4		0			SCC 13	15	100.0	0	0.0	0	0.0	1	6.7	15
Others	6		0		0		0			SCC 14	14	100.0	0	0.0	0	0.0	0	0.0	14
SCC 2	15	100.0	0	0.0	0	0.0	0	0.0	15	SCC 15	15	88.2	2	11.8	0	0.0	0	0.0	17
SCC 3	15	100.0	3	20.0	2	13.3	0	0.0	15	Model TCC	10		0		0		0		
SCC 4	14	93.3	0	0.0	1	6.7	0	0.0	15	Others	5		2		0		0		
SCC 5	15	100.0	0	0.0	0	0.0	0	0.0	15	SCC 16	14	93.3	1	6.7	0	0.0	0	0.0	15
SCC 6	15	100.0	0	0.0	0	0.0	0	0.0	15	SCC 17	12	75.0	5	31.3	1	6.3	0	0.0	16
SCC 7	15	100.0	0	0.0	0	0.0	0	0.0	15	Model TCC	8		3		0		0		
SCC 8	15	100.0	0	0.0	0	0.0	0	0.0	15	Others	4		2		1		0		
SCC 9	15	100.0	0	0.0	0	0.0	0	0.0	15	SCC 18	11	73.3	2	13.3	2	13.3	0	0.0	15
SCC 10	15	93.8	0	0.0	1	6.3	0	0.0	16	SCC 19	11	73.3	4	26.7	0	0.0	0	0.0	15
Model TCC	9		0		1		0			SCC 20	11	73.3	3	20.0	1	6.7	0	0.0	15
Others	6		0		0		0			SCC 21	14	93.3	1	6.7	1	6.7	0	0.0	15
Total	310	92.8	23	6.9	16	4.8	1	0.3	334										

Table 2.4-1 Land Holding Type of Household

						Lun	u Holum	<u>5 meu per .</u>	IIOuse	noiu						
	Total	Own	ed by HI	H	Rented in	/lease co	ontract	Rented ou	t/lease c	ontract	Received for	r share	cropping	Provided fo	r share o	cropping
SCC No	Number of Respondent	Number of Respondent	Area (ha)	Average (ha)												
SCC 0	15	15	9.40	0.6	0	0	0.0	1	0.50	0.0	2	1.00	0.1	0	0	0.0
SCC 1	16	16	12.99	0.8	2	1.90	0.1	1	0.17	0.0	7	4.56	0.3	3	1.97	0.1
Model TCC	10	10	4.85	0.5	2	1.90	0.2	0	0.00	0.0	5	2.73	0.3	1	0.83	0.1
Others	6	6	8.14	1.4	0	0.00	0.0	1	0.17	0.0	2	1.83	0.3	2	1.14	0.2
SCC 2	15	15	10.93	0.7	3	1.89	0.1	0	0	0.0	5	3.92	0.3	1	1.33	0.1
SCC 3	15	15	11.99	0.8	4	2.03	0.1	2	1.34	0.1	2	1.33	0.1	2	3.03	0.2
SCC 4	15	14	10.49	0.7	2	0.87	0.1	1	0.67	0.0	3	2.50	0.2	0	0	0.0
SCC 5	15	15	12.28	0.8	6	2.50	0.2	2	0.63	0.0	0	0	0.0	0	0	0.0
SCC 6	15	15	19.15	1.3	11	9.34	0.6	4	4.50	0.3	0	0	0.0	0	0	0.0
SCC 7	15	15	21.11	1.4	6	3.64	0.2	2	2.50	0.2	0	0	0.0	0	0	0.0
SCC 8	15	15	15.90	1.1	7	5.97	0.4	1	1.00	0.1	0	0	0.0	0	0	0.0
SCC 9	15	15	19.16	1.3	3	1.91	0.1	3	3.04	0.2	0	0	0.0	0	0	0.0
SCC 10	16	15	13.63	0.9	9	9.75	0.6	0	0	0.0	2	1.34	0.1	0	0	0.0
Model TCC	10	9	7.38	0.7	7	8.93	0.9	0	0	0.0	1	0.67	0.1	0	0	0.0
Others	6	6	6.25	1.0	2	0.82	0.1	0	0	0.0	1	0.67	0.1	0	0	0.0
SCC 11	15	15	12.11	0.8	7	14.00	0.9	1	0.67	0.0	3	4.37	0.3	0	0	0.0
SCC 12	15	13	18.52	1.2	11	9.87	0.7	1	2.67	0.2	2	1.70	0.1	1	0.17	0.0
SCC 13	15	15	8.99	0.6	2	1.30	0.1	1	0.33	0.0	2	1.34	0.1	0	0	0.0
SCC 14	14	14	9.61	0.7	2	1.17	0.1	1	0.33	0.0	6	3.32	0.2	1	0.50	0.0
SCC 15	17	17	15.45	0.9	7	8.01	0.5	0	0	0.0	4	3.23	0.2	3	2.53	0.1
Model TCC	10	10	8.29	0.8	6	6.01	0.6	0	0	0.0	1	0.23	0.0	0	0	0.0
Others	7	7	7.16	1.0	1	2.00	0.3	0	0	0.0	3	3.00	0.4	3	2.53	0.4
SCC 16	15	15	16.70	1.1	4	2.51	0.2	0	0	0.0	9	6.77	0.5	2	2.66	0.2
SCC 17	16	15	21.60	1.4	8	10.56	0.7	1	0.57	0.0	1	0.67	0.0	3	1.67	0.1
Model TCC	10	10	13.40	1.3	5	4.56	0.5	1	0.57	0.1	1	0.67	0.1	3	1.67	0.2
Others	6	5	8.20	1.4	3	6.00	1.0	0	0	0.0	0	0	0.0	0	0	0.0
SCC 18	15	13	15.11	1.0	9	17.63	1.2	0	0	0.0	1	1.33	0.1	2	6.00	0.4
SCC 19	15	15	23.27	1.6	4	3.53	0.2	3	2.01	0.1	1	1.33	0.1	4	4.44	0.3
SCC 20	15	14	20.99	1.4	7	17.32	1.2	0	0	0.0	2	4.00	0.3	4	7.17	0.5
SCC 21	15	15	16.46	1.1	10	21.15	1.4	0	0	0.0	0	0	0.0	1	2.00	0.1
Total	334	326	335.9	1.0	124	146.9	0.4	25	20.9	0.1	52	42.7	0.1	27	33.5	0.1

 Table 2.4-2
 Land Holding Area per Household

2.5 Membership in WUA, Cooperatives and Farmer Groups

	Befor	re 2041	2041	-2050	2051	-2060	2061	-2070	After	2070	No res	sponse	Total Respondent
SCC No	No	%	No	%	No	%	No	%	No	%	No	%	
SCC 0	0	0.0	12	80.0	2	13.3	0	0.0	1	6.7	0	0.0	15
SCC 1	7	43.8	0	0.0	2	12.5	6	37.5	1	6.3	0	0.0	16
Model TCC	4		0		1		4		1		0		
Others	3		0		1		2		0		0		
SCC 2	3	20.0	1	6.7	8	53.3	3	20.0	0	0.0	0	0.0	15
SCC 3	9	60.0	2	13.3	2	13.3	2	13.3	0	0.0	0	0.0	15
SCC 4	7	46.7	0	0.0	4	26.7	1	6.7	3	20.0	0	0.0	15
SCC 5	2	13.3	2	13.3	3	20.0	3	20.0	4	26.7	1	6.7	15
SCC 6	0	0.0	3	20.0	2	13.3	7	46.7	3	20.0	0	0.0	15
SCC 7	3	20.0	1	6.7	6	40.0	1	6.7	4	26.7	0	0.0	15
SCC 8	2	13.3	1	6.7	8	53.3	2	13.3	1	6.7	1	6.7	15
SCC 9	11	73.3	0	0.0	1	6.7	2	13.3	1	6.7	0	0.0	15
SCC 10	6	37.5	0	0.0	0	0.0	2	12.5	6	37.5	2	12.5	16
Model TCC	1		0		0		2		5		2		
Others	5		0		0		0		1		0		
SCC 11	4	26.7	3	20.0	5	33.3	1	6.7	2	13.3	0	0.0	15
SCC 12	5	33.3	2	13.3	5	33.3	1	6.7	2	13.3	0	0.0	15
SCC 13	0	0.0	5	33.3	2	13.3	2	13.3	1	6.7	5	33.3	15
SCC 14	0	0.0	1	7.1	9	64.3	3	21.4	1	7.1	0	0.0	14
SCC 15	0	0.0	3	17.6	0	0.0	6	35.3	1	5.9	7	41.2	17
Model TCC	0		1		0		5		0		4		
Others	0		2		0		1		1		3		
SCC 16	0	0.0	0	0.0	0	0.0	9	60.0	1	6.7	5	33.3	15
SCC 17	0	0.0	0	0.0	1	6.3	9	56.3	5	31.3	1	6.3	16
Model TCC	0		0		0		8		1		1		
Others	0		0		1		1		4		0		
SCC 18	0	0.0	1	6.7	0	0.0	7	46.7	5	33.3	2	13.3	15
SCC 19	0	0.0	0	0.0	1	6.7	5	33.3	2	13.3	7	46.7	15

Table 2.5-1 The Year Joining WUA by SCC

	Befor	re 2041	204	1-2050	2051	-2060	2061	-2070	Afte	r 2070	No res	sponse	Total Respondent
SCC No	No	%	No	%	No	%	No	%	No	%	No	%	
SCC 20	0	0.0	0	0.0	1	6.7	4	26.7	6	40.0	4	26.7	15
SCC 21	0	0.0	0	0.0	0	0.0	6	40.0	9	60.0	0	0.0	15
Total	59	17.7	37	11.1	62	18.6	82	24.6	59	17.7	35	10.5	334

Source: JICA Project Team

SCC No	Member of Agricultural		Member of Farmer		Total		Member of	Agricultural	Member of Farmer		Total
	Number of Respondent	Percentage (%)	No	%	Respondent	SCC No	Number of Respondent	Percentage (%)	No	%	Respondent
SCC 0	2	13.3	9	60.0	15	SCC 11	9	60.0	4	26.7	15
SCC 1	7	43.8	6	37.5	16	SCC 12	9	60.0	1	6.7	15
Model TCC	3		3			SCC 13	8	53.3	7	46.7	15
Others	4		3			SCC 14	0	0.0	1	7.1	14
SCC 2	7	46.7	5	33.3	15	SCC 15	1	5.9	1	5.9	17
SCC 3	6	40.0	4	26.7	15	Model TCC	0		0		
SCC 4	5	33.3	6	40.0	15	Others	1		1		
SCC 5	4	26.7	6	40.0	15	SCC 16	10	66.7	7	46.7	15
SCC 6	6	40.0	3	20.0	15	SCC 17	13	81.3	12	75.0	16
SCC 7	5	33.3	2	13.3	15	Model TCC	8		7		
SCC 8	5	33.3	1	6.7	15	Others	5		5		
SCC 9	7	46.7	2	13.3	15	SCC 18	15	100.0	1	6.7	15
SCC 10	7	43.8	1	6.3	16	SCC 19	13	86.7	4	26.7	15
Model TCC	5		1			SCC 20	14	93.3	9	60.0	15
Others	2		0			SCC 21	14	93.3	10	66.7	15
Total	167	50.0	102	30.5	334						

Table 2.5-2 The Member of Agricultural Cooperative and Farmer Group

3 Household Income and Expenditure

3.1 Household Income

		Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
		Average (NPR/year)	(%)	Average (NPR/year)	(%)	Average (NPR/year)	(%)	Average (NPR/year)	(%)	Average (NPR/year)	(%)
1	Agriculture	•									
1.1	Cereal, Vegetable, Fruit, Cash Crop	156,627	29.1	105,289	29.5	87,971	20.0	56,896	16.9	94,389	23.4
1.2	Livestock and Fisheries	73,192	13.6	36,175	10.1	73,320	16.6	59,350	17.6	60,465	15.0
2	Non-Agriculture										
2.1	Remittance (Overall)	188,655	35.1	81,333	22.8	216,943	49.2	80,961	24.0	123,326	30.6
2.1.1	Overseas remittance	176,092	32.8	80,702	22.6	211,429	48.0	74,865	22.2	116,539	28.9
2.1.2	Remittance (Domestic)	12,563	2.3	632	0.2	5,514	1.3	6,097	1.8	6,787	1.7
2.2	Grocery/Shops/Business	15,379	2.9	37,456	10.5	17,657	4.0	32,994	9.8	27,560	6.8
2.3	Contractor/ Builders	5,747	1.1	877	0.2	5,143	1.2	8,094	2.4	5,942	1.5
2.4	Services (Govt /Private /NGO)	36,253	6.7	59,316	16.6	27,543	6.2	56,258	16.7	48,560	12.0
2.5	Social security	30,437	5.7	14,968	4.2	6,886	1.6	10,394	3.1	16,028	4.0
2.6	Daily Wage	920	0.2	7,368	2.1	5,286	1.2	8,819	2.6	6,144	1.5
2.7	Other incomes sources	30,460	5.7	14,035	3.9	-	0.0	23,529	7.0	21,249	5.3
Total		537,670	100.0	356,819	100.0	440,749	100.0	337,295	100.0	403,661	100.0

 Table 3.1-1
 Annual Household Income by Municipality

Source: JICA Project Team

 Table 3.1-2
 Household Remittance Amount by Municipality

	Remittance from abroad							In-country Remittance						
	None		Up to NPR 500,000		More than NPR 500,000		None		Up to NPR 30,000		More than NPR 30,000			
	No	%	No	%	No	%	No	%	No	%	No	%		
Gauradaha (n=87)	62	71.3	16	64.0	9	36.0	81	93.1	5	83.3	1	16.7		
Gauriganj(n=57)	48	84.2	6	66.7	3	33.3	56	98.2	1	100.0	0	0.0		
Kamal (n=35)	24	68.6	7	63.6	4	36.4	32	91.4	3	100.0	0	0.0		
Shivasatakshi (n=155)	117	75.5	33	86.8	5	13.2	150	96.8	5	100.0	0	0.0		
Total (n=334)	251	75.1	62	74.7	21	25.3	319	95.5	14	93.3	1	6.7		
Source: IICA Project Team														
3.2 Household Expenditure

	Gauradaha	(n=87)	Gauriganj	(n=57)	Kamal ((n=35)	Shivasataks	ni (n=155)	Total (n	=334)
	Average (NPR/year)	(%)	Average (NPR/year)	(%)	Average (NPR/year)	(%)	Average (NPR/year)	(%)	Average (NPR/year)	(%)
Food	63,646	19.3	66,779	26.8	57,600	22.4	70,963	27.5	66,943	24.3
Clothing	20,598	6.2	19,816	7.9	14,063	5.5	17,852	6.9	18,505	6.7
Health/Medical	28,534	8.7	29,726	11.9	31,977	12.4	22,803	8.8	26,438	9.6
Education	51,564	15.6	35,158	14.1	35,200	13.7	33,901	13.2	38,852	14.1
Utilities	36,034	10.9	25,158	10.1	42,171	16.4	29,988	11.6	32,015	11.6
House Repair and Maintenance	387	0.1	460	0.2	29	0.1	251	0.1	299	0.1
KIS	613	0.2	638	0.3	511	0.2	356	0.1	487	0.2
Other IS	5,709	1.7	2,298	0.9	2,811	1.1	761	0.3	2,527	0.9
Agricultural Production	77,663	23.6	50,439	20.2	56,584	22.0	56,589	22.0	61,028	22.2
Сгор	51,670	-	39,092	-	35,634	-	30,700	-	38,111	-
Livestock	18,485	-	10,979	-	14,690	-	13,244	-	14,374	-
Fisheries	5,759	-	105	-	4,914	-	1,316	-	2,644	-
Vegetables	370	-	228	-	1,245	-	3,207	-	1,754	-
Other Agri-enterprises	1,379	-	35	-	100	-	8,123	-	4,145	-
Insurance	4,203	1.3	4,856	1.9	4,918	1.9	5,845	2.3	5,152	1.9
Interest payment (Bank/Cooperative)	40,741	12.4	14184	5.7	11,461	4.5	18,380	7.1	22,764	8.3
Total	329,692	100.0	249,512	100.0	257,326	100.0	257,688	100.0	275,010	100.0

Table 3.2-1 Annual Household Expenditure by Municipality

Source: JICA Project Team

4 Household Dietary Diversity and Effect of COVID

Table 3.2-1 Median HDDS Score of KIS

Madian HDDS Score: 8	Below]	Median	At Medi	ian Line	Above th	e Median	Total
Medial HDDS Scole. 8	No	%	No	%	No	%	Total
Gauradaha (n=87)	31	35.6	34	39.1	22	25.3	87
Gauriganj(n=57)	30	52.6	19	33.3	8	14.0	57
Kamal (n=35)	13	37.1	15	42.9	7	20.0	35
Shivasatakshi (n=155)	76	49.0	57	36.8	22	14.2	155
Total (n=334)	150	44.9	125	37.4	59	17.7	334
Source: JICA Project Team							

				1104501		J 21101810	J D D D D D D D D D D		,				
	Veg-	Household	Dietary Div	ersity Score	(HDDS) in	2021	Veg- Household Dietary Diversity Score (HDDS) in 2019						
	Below the average		Above th	e average	To	tal	Below the average		Above the average		Total		
	No	%	No	%	No	%	No	%	No	%	No	%	
Gauradaha (n=87)	2	28.6	5	71.4	7	8.0	2	28.6	5	71.4	7	8.0	
Gauriganj (n=57)	3	42.9	4	57.1	7	12.3	3	42.9	4	57.1	7	12.3	
Kamal (n=35)	2	100.0	0	0.0	2	5.7	2	100.0	0	0.0	2	5.7	
Shivasatakshi (n=155)	15	71.4	6	28.6	21	13.5	15	71.4	6	28.6	21	13.5	
Total (n=334)	22	59.5	15	40.5	37	11.1	22	59.5	15	40.5	37	11.1	

 Table 3.2-2
 Household Dietary Diversity Score (Vegetarian) of KIS

 Table 3.2-3
 Household Dietary Diversity Score (Non-vegetarian) of KIS

	Non-veg	g- Househol	ld Dietary D	versity Sco	ore (HDDS)	in 2021	Non-veg- Household Dietary Diversity Score (HDDS) in 2019						
	Below the	e average	Above th	e average	То	tal	Below th	e average	Above th	e average	To	tal	
	No	%	No	%	No	%	No	%	No	%	No	%	
Gauradaha (n=87)	41	51.3	39	48.8	80	92.0	41	51.3	39	48.8	80	92.0	
Gauriganj (n=57)	13	26.0	37	74.0	50	87.7	13	26.0	37	74.0	50	87.7	
Kamal (n=35)	16	48.5	17	51.5	33	94.3	16	48.5	17	51.5	33	94.3	
Shivasatakshi													
(n=155)	78	58.2	56	41.8	134	86.5	78	58.2	56	41.8	134	86.5	
Total (n=334)	148	49.8	149	50.2	297	88.9	148	49.8	149	50.2	297	88.9	

5 Water Management and Maintenance of Irrigation Facilities

5.1 Cropping Calendar and Water Distribution

	Total	Have you prep	pared cropping cale yea	endar in advance a ar?	nd utilized last	Do you know prepared	water distribution	plan by seasons w ation (irrigation se	hich should be hedule)?
SCC No	Number of	Y	es	N	0	Ň	lo	N	lo
	Respondent	Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)
SCC 0	15	0	0.0	15	100.0	14	93.3	1	6.7
SCC 1	16	0	0.0	16	100.0	14	87.5	2	12.5
Model TCC	10	0	0.0	10	100.0	9		1	
Others	6	0	0.0	6	100.0	5		1	
SCC 2	15	1	6.7	14	93.3	14	93.3	1	6.7
SCC 3	15	0	0.0	15	100.0	13	86.7	2	13.3
SCC 4	15	0	0.0	15	100.0	9	60.0	6	40.0
SCC 5	15	1	6.7	14	93.3	1	6.7	14	93.3
SCC 6	15	1	6.7	14	93.3	5	33.3	10	66.7
SCC 7	15	0	0.0	15	100.0	0	0.0	15	100.0
SCC 8	15	0	0.0	15	100.0	0	0.0	15	100.0
SCC 9	15	0	0.0	15	100.0	15	100.0	0	0.0
SCC 10	16	0	0.0	16	100.0	16	100.0	0	0.0
Model TCC	10	0	0.0	10	100.0	10		0	
Others	6	0	0.0	6	100.0	6		0	
SCC 11	15	0	0.0	15	100.0	15	100.0	0	0.0
SCC 12	15	0	0.0	15	100.0	15	100.0	0	0.0
SCC 13	15	0	0.0	15	100.0	15	100.0	0	0.0
SCC 14	14	0	0.0	14	100.0	14	100.0	0	0.0
SCC 15	17	0	0.0	17	100.0	17	100.0	0	0.0
Model TCC	10	0	0.0	10	100.0	10		0	
Others	7	0	0.0	7	100.0	7		0	
SCC 16	15	0	0.0	15	100.0	15	100.0	0	0.0

Table 5.1-1 Preparation of Cropping Calendar and Water Distribution Plan

		Have you prep	pared cropping cale	endar in advance a	nd utilized last	Do you know	water distribution	plan by seasons w	hich should be	
	Total		ye			prepared	a defote the cultiva	ation (inigation schedule)?		
SCC No	Number of	Y	es	N	lo	N	lo	Ν	lo	
	Respondent	Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)	
SCC 17	16	0	0.0	16	100.0	16	100.0	0	0.0	
Model TCC	10	0	0.0	10	100.0	10		0		
Others	6	0	0.0	6	100.0	6		0		
SCC 18	15	0	0.0	15	100.0	14	93.3	1	6.7	
SCC 19	15	0	0.0	15	100.0	15	100.0	0	0.0	
SCC 20	15	0	0.0	15	100.0	15	100.0	0	0.0	
SCC 21	15	0	0.0	15	100.0	15	100.0	0	0.0	
Total	334	3	0.9	331	99.1	267	79.9	67	20.1	

Source: JICA Project Team

		Have you prepared	l and utilized water distributed	ution plan by seasons (irrigati	on schedule)?
SCC No	Number of Respondents	Yes		No	
		Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)
SCC 0	15	12	80.0	3	20.0
SCC 1	16	12	75.0	4	25.0
Model TCC	10	7	70.0	3	30.0
Others	6	5	83.3	1	16.7
SCC 2	15	14	93.3	1	6.7
SCC 3	15	13	86.7	2	13.3
SCC 4	15	9	60.0	6	40.0
SCC 5	15	2	13.3	13	86.7
SCC 6	15	3	20.0	12	80.0
SCC 7	15	0	0.0	15	100.0
SCC 8	15	0	0.0	15	100.0
SCC 9	15	15	100.0	0	0.0
SCC 10	16	15	93.8	1	6.3
Model TCC	10	9	90.0	1	10.0
Others	6	6	100.0	0	0.0

Table 5.1-2 Responses on Utilization of Water Distribution Plan

		Have you prepared and utilized water distribution plan by seasons (irrigation schedule)?								
SCC No	Number of Respondents	Yes		No						
		Number of Respondent	Percentage (%)	Number of Respondent	Percentage (%)					
SCC 11	15	14	93.3	1	6.7					
SCC 12	15	15	100.0	0	0.0					
SCC 13	15	13	86.7	2	13.3					
SCC 14	14	11	78.6	3	21.4					
SCC 15	17	7	41.2	10	58.8					
Model TCC	10	4	40.0	6	60.0					
Others	7	3	42.9	4	57.1					
SCC 16	15	13	86.7	2	13.3					
SCC 17	16	13	81.3	3	18.8					
Model TCC	10	10	100.0	0	0.0					
Others	6	3	50.0	3	50.0					
SCC 18	15	12	80.0	3	20.0					
SCC 19	15	4	26.7	11	73.3					
SCC 20	15	13	86.7	2	13.3					
SCC 21	15	9	60.0	6	40.0					
Total	334	219	65.6	115	34.4					

6 Agriculture Production

6.1 **Production of Crops and Vegetables**

Nama of	Number of	Total		•	Rice	•	0		.	Maize		
Municipality	Respondent	Agricultural Land (ha)	Number of Respondent	Cultivated Are (ha)	Coverage (%)	Household (%)	Yield (MT/ha)	Number of Respondent	Cultivated Are (ha)	Coverage (%)	Household (%)	Yield (MT/ha)
Gauradaha	87	165.1	82	58.4	35.4	94.3	4.5	1	0.2	0.1	1.1	3.6
Gauriganj	57	88.5	34	24.0	27.1	59.6	5.0	8	1.8	2.0	14.0	2.4
Kamal	35	43.5	31	15.1	34.7	88.6	5.1	0	NA	NA	NA	NA
Shivasatakshi	155	129.8	44	19.5	15.0	28.4	4.6	38	19.5	15.0	24.5	4.6
Total	334	426.9	191	117.0	27.4	57.2	4.7	47	19.5	4.6	14.1	3.2
Name of	Number of	Total			Pulses				V	Vegetables		
Municipality	Respondent	Agricultural Land (ha)	Number of Respondent	Cultivated Are (ha)	Coverage (%)	Household (%)	Yield (MT/ha)	Number of Respondent	Cultivated Are (ha)	Coverage (%)	Household (%)	Yield (MT/ha)
Gauradaha	87	165.1	1	0.3	0.2	1.1	0.4	0	NA	NA	NA	NA
Gauriganj	57	88.5	1	0.5	0.6	1.8	0.1	1	0.2	0.2	1.8	6.5
Kamal	35	43.5	1	0.0	0.1	2.9	1.6	0	NA	NA	NA	NA
Shivasatakshi	155	129.8	3	1.0	0.8	1.9	0.2	3	0.2	0.1	1.9	4.3
Total	334	426.9	6	1.9	0.4	1.8	0.2	4	0.4	0.1	1.2	5.5
Name of	Number of	Total			Potato					Jute		
Municipality	Total Respondent	Agricultural Land (ha)	Number of Respondent	Cultivated Are (ha)	Coverage (%)	Household (%)	Yield (MT/ha)	Number of Respondent	Cultivated Are (ha)	Coverage (%)	Household (%)	Yield (MT/ha)
Gauradaha	87	165.1	1	0.4	0.2	1.1	5.5	0	NA	NA	NA	NA
Gauriganj	57	88.5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
Kamal	35	43.5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
Shivasatakshi	155	129.8	0	NA	NA	NA	NA	1	0.03	0.03	0.65	1.80
Total	334	426.9	1	0.4	0.1	0.3	5.5	1	0.03	0.01	0.30	1.80

$1 a D C 0.1^{-1}$ Crops Crown by Farmers in Spring Scason by Municipality
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Table 6.1-2 Crops Grown by Farmers in Winter Season by Municipality (1)												
				В	uckwheat					Maize		
Name of Municipality	Number of Total Respondent	Total Agricultural Land (ha)	Number of Respond ent	Cultivate d Are (ha)	Covera ge (%)	Househ old (%)	Yield (MT/ha)	Number of Responde nt	Cultivate d Are (ha)	Coverag e (%)	Househol d (%)	Yield (MT/ha)
Gauradaha	87	165.1	26	3.9	2.4	29.9	1.2	64	12.9	7.8	73.6	3.3
Gauriganj	57	88.5	10	1.3	1.5	17.5	1.2	23	5.4	6.1	40.4	7.1
Kamal	35	43.5	9	1.4	3.2	25.7	1.4	28	4.7	10.7	80.0	4.0
Shivasatakshi	155	129.8	9	1.3	1.0	5.8	1.0	106	18.3	14.1	68.4	4.5
Total	334	426.9	54	7.9	1.8	16.2	1.2	221	41.3	9.7	66.2	4.4
				-	Mustard					Potato		
Name of Municipality	Number of Total Respondent	Total Agricultural Land (ha)	Number of Respond ent	Cultivate d Are (ha)	Covera ge (%)	Househ old (%)	Yield (MT/ha)	Number of Responde nt	Cultivate d Are (ha)	Coverag e (%)	Househol d (%)	Yield (MT/ha)
Gauradaha	87	165.1	49	10.6	6.4	56.3	0.7	44	2.1	1.3	50.6	7.7
Gauriganj	57	88.5	21	3.6	4.1	36.8	0.6	22	1.0	1.1	38.6	5.2
Kamal	35	43.5	23	4.1	9.4	65.7	0.7	22	0.6	1.5	62.9	8.8
Shivasatakshi	155	129.8	80	12.5	9.6	51.6	0.8	104	3.0	2.3	67.1	8.4
Total	334	426.9	173	30.7	7.2	51.8	0.7	192	6.8	1.6	57.5	7.7
				Fo	rage Crops	S				Lentil		
Name of Municipality	Number of Responden t	Total Agricultural Land (ha)	Number of Respond ent	Cultivate d Area (ha)	Covera ge (%)	Househ old (%)	Yield (MT/ha)	Number of Respond ent	Cultivate d Are (ha)	Coverage (%)	Househo ld (%)	Yield (MT/ha)
Gauradaha	87	165.1	1	0.2	0.1	1.1	3.0	1.0	0.2	0.1	1.1	1.2
Gauriganj	57	88.5	2	0.2	0.2	3.5	8.2	1.0	0.8	0.9	1.8	0.3
Kamal	35	43.5	NA	NA	NA	NA	NA	0.0	NA	NA	NA	NA
Shivasatakshi	155	129.8	NA	NA	NA	NA	NA	6.0	0.6	0.5	3.9	1.1
Total	334	426.9	3	0.3	0.1	0.9	5.6	8.0	1.6	0.4	2.4	0.7

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			y crops (STOWIE DY 1		II winter	Season by	by Municipanty (2)				
					Pulses					Sugarcane		
Name of Municipality	Number of Responden t	Total Agricultural Land (ha)	Number of Respond ent	Cultivate d Are (ha)	Covera ge (%)	Househ old (%)	Yield (MT/ha)	Number of Respond ent	Cultivate d Are (ha)	Coverage (%)	Househo ld (%)	Yield (MT/ha)
Gauradaha	87	165.1	1.0	0.2	0.1	1.1	0.1	2.0	1.8	1.1	2.3	24.1
Gauriganj	57	88.5	1.0	0.1	0.1	1.8	0.8	0.0	NA	NA	NA	NA
Kamal	35	43.5	0.0	NA	NA	NA	NA	0.0	NA	NA	NA	NA
Shivasatakshi	155	129.8	9.0	0.8	0.6	5.8	1.0	0.0	NA	NA	NA	NA
Total	334	426.9	11.0	1.0	0.2	3.3	0.9	2.0	1.8	0.4	0.6	24.1
	Number of				Tomato					Vegetables		
Name of Municipality	Total Responden t	Total Cultivated Area (ha)	Number of Respond ent	Cultivate d Are (ha)	Covera ge (%)	Househ old (%)	Yield (MT/ha)	Number of Respond ent	Cultivate d Are (ha)	Coverage (%)	Househo ld (%)	Yield (MT/ha)
Gauradaha	87	165.1	0.0	NA	NA	NA	NA	0.0	NA	NA	NA	NA
Gauriganj	57	88.5	0.0	NA	NA	NA	NA	3.0	0.3	0.3	0.5	8.0
Kamal	35	43.5	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shivasatakshi	155	129.8	4.0	0.2	0.1	2.6	28.8	25.0	3.3	2.6	16.1	13.3
Total	334	426.9	4.0	0.2	0.0	1.2	28.8	28.0	3.6	0.8	8.4	12.9
Name of Municipality	Number of Total Responden t	Total Cultivated Area (ha)	Number of Respond ent	Cultivate d Are (ha)	Wheat Covera ge (%)	Househ old (%)	Yield (MT/ha)					
Gauradaha	87	165.1	6.0	1.1	0.6	6.9	1.8					
Gauriganj	57	88.5	8.0	1.2	1.4	14.0	2.8					
Kamal	35	43.5	1.0	0.3	0.8	2.9	1.5					
Shivasatakshi	155	129.8	3.0	0.4	0.3	1.9	2.2					
Total	334	426.9	18.0	3.0	0.7	5.4	2.2					

Table 6.1-3 Crops Grown by Farmers in Winter Season by Municipality (2)

6.2 Agricultural Input

	Gau	radaha (n=	=87)	Gaı	ıriganj (n=	=57)	K	amal (n=3	5)	Shivas	satakshi (r	i=155)	Ov	verall (n=3	34)
Innuts		Rice			Rice			Rice			Rice			Rice	
inputs	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)
Purchased Seed	87	56	35.4	57	23	24.5	35	27	48.2	154	105	40.9	333	211	37.3
Irrigation Water	87	156	98.7	57	91	96.8	35	56	100.0	154	250	97.3	333	553	97.9
Chemical Fertiliser	87	152	96.2	57	93	98.9	35	53	94.6	154	249	96.9	333	547	96.8
Organic Manure	87	52	32.9	57	27	28.7	35	27	48.2	154	197	76.7	333	303	53.6
Pesticide	87	147	93.0	57	90	95.7	35	43	76.8	154	194	75.5	333	474	83.9
Fungicide	87	26	16.5	57	2	2.1	35	4	7.1	154	20	7.8	333	52	9.2
Labour hired from outside	87	148	93.7	57	91	96.8	35	55	98.2	154	243	94.6	333	537	95.0

Table 6.2-1 Percent of Household Using Agricultural Inputs in Rainy Season

Source: JICA Project Team

Table 6 2 2	Doroont of Household	Licing Agricultural	Inpute in Wi	ntor Socon (1)
1 able 0.2-2	I el cent ol mousenoiu	Using Agricultural	i inputs in wi	niel Season (1)

		Buckwheat			Forage Crop		Lentil				
	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)		
Purchased Seed	54	13	24.1	3	2	66.7	8	6	75.0		
Irrigation Water	54	33	61.1	3	3	100.0	8	5	62.5		
Chemical Fertiliser	54	32	59.3	3	3	100.0	8	5	62.5		
Organic Manure	54	31	57.4	3	2	66.7	8	5	62.5		
Pesticide	54	14	25.9	3	2	66.7	8	4	50.0		
Fungicide	54	9	16.7	3	0	0.0	8	1	12.5		
Labour hired from outside	54	41	75.9	3	1	33.3	8	4	50.0		

	Table 6.2	-3 Percent of H	ousehold Usi	ing Agricultu	ral Inputs in	Winter Sease	on (2)		
		Maize			Mustard			Potato	
	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)
Purchased Seed	221	214	90.7	173	40	22.3	192	182	94.3
Irrigation Water	221	220	93.2	173	135	75.4	192	159	82.4
Chemical Fertiliser	221	225	95.3	173	170	95.0	192	180	93.3
Organic Manure	221	212	89.8	173	148	82.7	192	188	97.4
Pesticide	221	207	87.7	173	150	83.8	192	172	89.1
Fungicide	221	54	22.9	173	139	77.7	192	171	88.6
Labour hired from outside	221	189	80.1	173	107	59.8	192	101	52.3
		Pulses			Suagrcane			Tomato	
	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)
Purchased Seed	11	8	72.7	2	0	0.0	4	4	100.0
Irrigation Water	11	6	54.5	2	2	100.0	4	3	75.0
Chemical Fertiliser	11	5	45.5	2	2	100.0	4	4	100.0
Organic Manure	11	7	63.6	2	1	50.0	4	4	100.0
Pesticide	11	5	45.5	2	2	100.0	4	4	100.0
Fungicide	11	3	27.3	2	1	50.0	4	3	75.0
Labour hired from outside	11	5	45.5	2	2	100.0	4	2	50.0
		Vegetables			Wheat				
	Total	Number of User	(%)	Total	Number of User	(%)			
Purchased Seed	28	33	91.7	18	11	61.1			
Irrigation Water	28	35	97.2	18	17	94.4			
Chemical Fertiliser	28	34	94.4	18	18	100.0			
Organic Manure	28	35	97.2	18	10	55.6			
Pesticide	28	32	88.9	18	7	38.9			
Fungicide	28	24	66.7	18	4	22.2			
Labour hired from outside	28	21	58.3	18	12	66.7			

1 able 0.2-4	I tittin v	of mousen	loiu Usin	g Agricu	iturai inp	uts m sp	oring Season						
		Rice			Maize			Pulses					
	Total	Number of User	(%)	Total	Number of User	(%)	Total	Number of User	(%)				
Purchased Seed	191	132	68.8	47	39	73.6	6	4	57.1				
Irrigation Water	191	190	99.0	47	48	90.6	6	3	42.9				
Chemical Fertiliser	191	192	100.0	47	50	94.3	6	3	42.9				
Organic Manure	191	131	68.2	47	51	96.2	6	5	71.4				
Pesticide	191	182	94.8	47	42	79.2	6	2	28.6				
Fungicide	191	38	19.8	47	10	18.9	6	1	14.3				
Labour hired from outside	191	189	98.4	47	40	75.5	6	5	71.4				
		Vegetables			Potato			Jute					
	Total	Vegetables Number of User	(%)	Total	Potato Number of User	(%)	Total	Jute Number of User	(%)				
Purchased Seed	Total 4	Vegetables Number of User 6	(%) 100.0	Total	Potato Number of User 0	(%)	Total	Jute Number of User 1	(%)				
Purchased Seed Irrigation Water	Total 4 4	Vegetables Number of User 6 6	(%) 100.0 100.0	Total	Potato Number of User 0 1	(%) 0.0 100.0	Total	Jute Number of User 1 0	(%) 100.0 0.0				
Purchased Seed Irrigation Water Chemical Fertiliser	Total 4 4 4 4	Vegetables Number of User 6 6 6	(%) 100.0 100.0 100.0	Total 1 1	Potato Number of User 0 1 0	(%) 0.0 100.0 0.0	Total 1 1	Jute Number of User 1 0 0	(%) 100.0 0.0 0.0				
Purchased Seed Irrigation Water Chemical Fertiliser Organic Manure	Total 4 4 4 4 4 4 4 4 4	Vegetables Number of User 6 6 6 6	(%) 100.0 100.0 100.0 100.0	Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Potato Number of User 0 1 0 1	(%) 0.0 100.0 0.0 100.0	Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Jute Number of User 1 0 0 0 1	(%) 100.0 0.0 100.0				
Purchased Seed Irrigation Water Chemical Fertiliser Organic Manure Pesticide	Total 4 4 4 4 4 4 4 4 4 4 4	Vegetables Number of User 6 6 6 6 6 6	(%) 100.0 100.0 100.0 100.0 100.0	Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Potato Number of User 0 1 0 1 0	(%) 0.0 100.0 0.0 100.0 0.0	Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Jute Number of User 1 0 0 1 1 0	(%) 100.0 0.0 100.0 100.0				
Purchased Seed Irrigation Water Chemical Fertiliser Organic Manure Pesticide Fungicide	Total 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Vegetables Number of User 6 6 6 6 6 1	(%) 100.0 100.0 100.0 100.0 100.0 16.7	Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Potato Number of User 0 1 0 1 0 0 0	(%) 0.0 100.0 0.0 100.0 0.0 0.0	Total 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Jute Number of User 1 0 0 1 1 0 0 0	(%) 100.0 0.0 100.0 0.0 0.0 0.0				

Table 6.2-4 Percent of Household Using Agricultural Inputs in Spring Season

7 Market Information

7.1 Place for Sale of Agricultural Product

	Ga	uradaha	G	lauriganj]	Kamal	Shiv	vasatakshi	То	tal
	No	%	No	%	No	%	No	%	No	%
Model TCC										
Farmgate	1	10.0	9	90.0	9	90.0	2	20.0	21	52.5
House	7	70.0	8	80.0	2	20.0	5	50.0	22	55.0
Village market	3	30.0	0	0.0	0	0.0	0	0.0	3	7.5
Roadside market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Town/City market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Damak market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Birtamode market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside District	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Province	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Nepal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
No surplus amount for sale/consumed by HHs	0	0.0	0	0.0	0	0.0	3	30.0	3	7.5
Model SCC										
Farmgate	5	71.4	2	100.0	3	50.0	4	40.0	14	56.0
House	2	28.6	2	100.0	3	50.0	8	80.0	15	60.0
Village market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Roadside market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Town/City market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Damak market	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0
Birtamode market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside District	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Province	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Nepal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

 Table 7.1-1
 Place for Sale of Agricultural Product (Cereal)

Technical Cooperation Project for the Promotion of Irrigated	Agriculture	in Terai Plain
	Baseline	Survey Report

	Ga	uradaha	G	auriganj]	Kamal	Shiv	vasatakshi	То	tal
	No	%	No	%	No	%	No	%	No	%
No surplus amount for sale/consumed by HHs	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0
Non-Model										
Farmgate	62	88.6	28	62.2	15	78.9	49	36.3	154	57.2
House	9	12.9	33	73.3	2	10.5	81	60.0	125	46.5
Village market	1	1.4	2	4.4	0	0.0	2	1.5	5	1.9
Roadside market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Town/City market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Damak market	1	1.4	1	2.2	0	0.0	0	0.0	2	0.7
Birtamode market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside District	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Province	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Nepal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
No surplus amount for sale/consumed by HHs	0	0.0	4	8.9	3	15.8	20	14.8	27	10.0
Overall										
Farmgate	68	78.2	39	68.4	27	77.1	55	35.5	189	56.6
House	18	20.7	43	75.4	7	20.0	94	60.6	162	48.5
Village market	4	4.6	2	3.5	0	0.0	2	1.3	8	2.4
Damak market	1	1.1	1	1.8	0	0.0	1	0.6	3	0.9
Birtamode market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
No surplus amount for sale/consumed by HHs	0	0.0	4	7.0	3	8.6	24	15.5	31	9.3

Table 7.1-2 Place for Sale of Agricultural Product (Vegetable)											
	G	auradaha	G	auriganj		Kamal	Shivas	satakshi	Total		
		(n=87)		(n=57)		(n=35)	(n=	:155)	(n=	334)	
	No	%	No	%	No	%	No	%	No	%	
Model SC/TC											
Farmgate	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
House	0	0.0	0	0.0	0	0.0	6	60.0	6	15.0	
Village market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Roadside market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Town/City market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Damak market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Birtamode market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Outside District	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Outside Province	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Outside Nepal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
No surplus amount for sale/consumed by											
HHs	10	100.0	10	100.0	10	100.0	4	40.0	34	85.0	
Model SC											
Farmgate	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
House	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Village market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Roadside market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Town/City market	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0	
Damak market	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0	
Birtamode market	0	0.0	0	0.0	0	0.0	2	20.0	2	8.0	
Outside District	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Outside Province	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
Outside Nepal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
No surplus amount for sale/consumed by HHs	7	100.0	2	100.0	6	100.0	7	70.0	22	88.0	
Non-Model											

	G	auradaha	G	auriganj		Kamal $(n=35)$	Shiva	satakshi	To (n=	otal 334)
	No	(II=07) %	No	(II=57) %	No	(II=33) %	No	~1 <i>33)</i> %	No	%
Farmgate	3	4.3	0	0.0	0	0.0	0	0.0	3	1.1
House	1	1.4	0	0.0	3	15.8	13	9.6	17	6.3
Village market	0	0.0	4	8.9	1	5.3	16	11.9	21	7.8
Roadside market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Town/City market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Damak market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Birtamode market	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside District	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Province	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Outside Nepal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
No surplus amount for sale/consumed by HHs	66	94.3	41	91.1	16	84.2	107	79.3	230	85.5
Overall										
Farmgate	3	3.4	0	0.0	0	0.0	0	0.0	3	0.9
House	1	1.1	0	0.0	3	8.6	19	12.3	23	6.9
Village market	0	0.0	4	7.0	1	2.9	16	10.3	21	6.3
Town/City market	0	0.0	0	0.0	0	0.0	1	0.6	1	0.3
Damak market	0	0.0	0	0.0	0	0.0	1	0.6	1	0.3
Birtamode market	0	0.0	0	0.0	0	0.0	2	1.3	2	0.6
No surplus amount for sale/consumed by HHs	83	95.4	53	93.0	32	91.4	118	76.1	286	85.6

7.2 Purchaser of Agricultural Product

	Gau (r	uradaha n=87)	Gau (n	uriganj =57)	Ka (n=	umal =35)	Shiva (n	asatakshi =155)	To (n=	otal 334)
	No	%	No	%	No	%	No	%	No	%
Model SC/TC										
Middleman/Collector	3	30.0	0	0.0	0	0.0	0	`	3	7.5
Consumer	0	0.0	1	10.0	0	0.0	1	10.0	2	5.0
Retailer	7	70.0	9	90.0	10	100.0	6	60.0	32	80.0
Wholesaler	0	0.0	0	0.0	0	0.0	1	10.0	1	2.5
Processing firm	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
In the Market (Haat Bazar)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Model SC										
Middleman/Collector	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Consumer	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0
Retailer	7	100.0	2	100.0	4	66.7	4	40.0	17	68.0
Wholesaler	1	14.3	0	0.0	2	33.3	3	30.0	6	24.0
Processing firm	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
In the Market (Haat Bazar)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Non-Model										
Middleman/Collector	0	0.0	0	0.0	1	5.3	1	0.7	2	0.7
Consumer	1	1.4	0	0.0	2	10.5	8	5.9	11	4.1
Retailer	49	70.0	33	73.3	13	68.4	54	40.0	149	55.4
Wholesaler	31	44.3	7	15.6	2	10.5	53	39.3	93	34.6
Processing firm	1	1.4	0	0.0	0	0.0	0	0.0	1	0.4
In the Market (Haat Bazar)	1	1.4	0	0.0	0	0.0	0	0.0	1	0.4
Overall										
Middleman/Collector	3	3.4	0	0.0	1	2.9	1	0.6	5	1.5
Consumer	1	1.1	1	1.8	2	5.7	10	6.5	14	4.2

Table 7.2-1 Farmer's Preference to Sell Their Products (Cereal)

	Gau (r	uradaha n=87)	Gau (r	uriganj n=57)	Ka (n:	amal =35)	Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Retailer	63	72.4	44	77.2	27	77.1	64	41.3	198	59.3
Wholesaler	32	36.8	7	12.3	4	11.4	57	36.8	100	29.9
Processing firm	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3
In the Market (Haat Bazar)	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3
Production is not enough for our own family	0	0.0	4	7.0	3	8.6	24	15.5	31	9.3

Source: JICA Project Team

Table 7.2-2 Farmer's Preference to Sell Their Products (Vegetable)

	Gauradaha		Gauriganj		Ka	mal	Shivas	atakshi	То	tal
	(n=	87)	(n=	57)	(n=	35)	(n=	155)	(n=2	334)
	No	%	No	%	No	%	No	%	No	%
Model SC/TC										
Middleman/Collector	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Consumer	0	0.0	0	0.0	0	0.0	4	40.0	4	10.0
Retailer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Wholesaler	0	0.0	0	0.0	0	0.0	1	10.0	1	2.5
Processing firm	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
In the Market (Haat Bazar)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Production is not enough for our own family	10	100.0	10	100.0	10	100.0	5	50.0	35	87.5
Model SC										
Middleman/Collector	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Consumer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Retailer	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0
Wholesaler	0	0.0	0	0.0	0	0.0	2	20.0	2	8.0
Processing firm	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
In the Market (Haat Bazar)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Production is not enough for our own family	7	100.0	2	100.0	6	100.0	7	70.0	22	88.0
Non-Model										

	Gauradaha (n=87)		Gaur (n=	Gauriganj (n=57)		mal 35)	Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Middleman/Collector	1	1.4	0	0.0	0	0.0	1	0.7	2	0.7
Consumer	2	2.9	2	4.4	2	10.5	21	15.6	27	10.0
Retailer	0	0.0	1	2.2	2	10.5	11	8.1	14	5.2
Wholesaler	2	2.9	0	0.0	0	0.0	0	0.0	2	0.7
Processing firm	1	1.4	0	0.0	0	0.0	0	0.0	1	0.4
In the Market (Haat Bazar)	0	0.0	1	2.2	0	0.0	0	0.0	1	0.4
Production is not enough for our own family	66	94.3	41	91.1	16	84.2	107	79.3	230	85.5
Overall										
Middleman/Collector	1	1.1	0	0.0	0	0.0	1	0.6	2	0.6
Consumer	2	2.3	2	3.5	2	5.7	25	16.1	31	9.3
Retailer	0	0.0	1	1.8	2	5.7	12	7.7	15	4.5
Wholesaler	2	2.3	0	0.0	0	0.0	3	1.9	5	1.5
Processing firm	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3
In the Market (Haat Bazar)	0	0.0	1	1.8	0	0.0	0	0.0	1	0.3
Production is not enough for our own family	83	95.4	53	93.0	32	91.4	119	76.8	287	85.9

7.3 Cultivation Schedule

	Gauradaha		G	auriganj	K	Lamal	Shi	vasatakshi	Т	otal
	No	%	No	%	No	%	No	%	No	%
Model SC/TC										
Adjustment to market price/demand in the markets	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Considering traditional festival	1	10.0	0	0.0	5	50.0	10	100.0	16	40.0
Follow neighbourhood cultivation	4	40.0	4	40.0	2	20.0	0	0.0	10	25.0
Follow local practice	5	50.0	6	60.0	3	30.0	0	0.0	14	35.0
Model SC										
Adjustment to market price/demand in the markets	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Considering traditional festival,	3	42.9	0	0.0	1	16.7	6	60.0	10	40.0
Follow neighbourhood cultivation	3	42.9	0	0.0	3	50.0	0	0.0	6	24.0
Follow local practice	1	14.3	2	100.0	2	33.3	4	40.0	9	36.0
Non-Model										
Adjustment to market price/demand in the markets	2	2.9	0	0.0	0	0.0	2	1.5	4	1.5
Considering traditional festival,	28	40.0	1	2.2	8	42.1	59	43.7	96	35.7
Follow neighbourhood cultivation	26	37.1	8	17.8	6	31.6	9	6.7	49	18.2
Follow local practice	14	20.0	36	80.0	5	26.3	65	48.1	120	44.6
Overall										
Adjustment to market price/demand in the markets	2	2.3	0	0.0	0	0.0	2	1.3	4	1.2
Considering traditional festival,	32	36.8	1	1.8	14	40.0	75	48.4	122	36.5
Follow neighbourhood cultivation	33	37.9	12	21.1	11	31.4	9	5.8	65	19.5
Follow local practice	20	23.0	44	77.2	10	28.6	69	44.5	143	42.8

Table 7.3-1 Practice to Decide Sowing/Planting Crops

7.4 Transportation of Agricultural Product

	Table 7.4-1 Transportation of Agricultural Froduct									
	Ga	Gauradaha		Gauriganj		mal	Shivas	atakshi	Т	otal
	((n=87)		(n=57)		(n=35)		(n=155)		-334)
	No	%	No	%	No	%	No	%	No	%
On foot	6	6.9	0	0.0	0	0.0	2	1.3	8	2.4
Collected by middleman/collector	46	52.9	44	77.2	17	48.6	125	80.6	232	69.5
Cart	3	3.4	1	1.8	0	0.0	0	0.0	4	1.2
Tractor	56	64.4	3	5.3	28	80.0	7	4.5	94	28.1
Truck/pick-up van	7	8.0	2	3.5	1	2.9	4	2.6	14	4.2
Motorcycle	0	0.0	0	0.0	0	0.0	4	2.6	4	1.2
Bicycle	0	0.0	6	10.5	3	8.6	8	5.2	17	5.1

Table 7.4-1 Transportation of Agricultural Product

Source: JICA Project Team

7.5 Constraints on Marketing

				ting Const	1 anns					
Particulars	Gauradaha (n=87)		Gaur (n=	iganj 57)	Kaı (n=	mal 35)	Shivas (n=1	atakshi 155)	Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Low prices for the products	85	97.7	53	93.0	33	94.3	143	92.3	314	94.0
Price fluctuations	48	55.2	31	54.4	21	60.0	35	22.6	135	40.4
Lack of market information	33	37.9	6	10.5	16	45.7	12	7.7	67	20.1
Limited buyer	41	47.1	1	1.8	19	54.3	11	7.1	72	21.6
Low access to market	45	51.7	6	10.5	20	57.1	18	11.6	89	26.6
Limited marketing knowledge	2	2.3	4	7.0	1	2.9	9	5.8	16	4.8
Lack of transportation facilities	27	31.0	2	3.5	5	14.3	5	3.2	39	11.7

Table 7.5-1 Marketing Constraints

7.6 Agricultural Business Plan

Destimiter	Gaura	adaha 87)	Gaur	iganj	Kamal (n=35)		Shivas	atakshi	Total $(n-334)$	
Particulars	No (II=	%	No (II–	%	No	%	No	%	No	%
Model SC/TC										
Prepared	1	10.0	0	0.0	0	0.0	0	0.0	1	2.5
Not Prepared	9	90.0	10	100.0	10	100.0	10	100.0	39	97.5
Model SC										
Prepared	2	28.6	0	0.0	0	0.0	0	0.0	2	8.0
Not Prepared	5	71.4	2	100.0	6	100.0	10	100.0	23	92.0
Non-Model										
Prepared	2	2.9	0	0.0	0	0.0	3	2.2	5	1.9
Not Prepared	68	97.1	45	100.0	19	100.0	132	97.8	264	98.1
Overall										
Prepared	5	5.7	0	0.0	0	0.0	3	1.9	8	2.4
Not Prepared	82	94.3	57	100.0	35	100.0	152	98.1	326	97.6

Table 7.6-1 Agricultural Business Plan Prepared by Farmers Based on Market Information

Source: JICA Project Team

Table 7.6-2 Reason not to Prepare Agricultural Business Plan

	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)	
	No	%	No	%	No	%	No	%	No	%
Model TC										
Busy to make a plan/ Not Necessary	5	50.0	5	50.0	6	60.0	1	10.0	17	42.5
Lack of market facility	0	0.0	1	10.0	0	0.0	0	0.0	1	2.5
Lack of knowledge	4	40.0	4	40.0	4	40.0	9	90.0	21	52.5
Not a practice	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Model SCC										
Busy to make a plan/ Not Necessary	2	28.6	1	50.0	2	33.3	4	40.0	9	36.0

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	Gauradaha (n=87)		Gauriganj (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Tc (n=1	otal 334)
	No	%	No	%	No	%	No	%	No	%
Lack of market facility	0	0.0	0	0.0	2	33.3	0	0.0	2	8.0
Lack of knowledge	3	42.9	1	50.0	2	33.3	6	60.0	12	48.0
Not a practice	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Non-Model										
Busy to make a plan/ Not Necessary	42	60.0	23	51.1	15	78.9	32	23.7	112	41.6
Lack of market facility	6	8.6	1	2.2	0	0.0	1	0.7	8	3.0
Lack of knowledge	19	27.1	19	42.2	4	21.1	90	66.7	132	49.1
Not a practice	1	1.4	2	4.4	0	0.0	9	6.7	12	4.5
Overall										
Busy to make a plan/ Not Necessary	49	56.3	29	50.9	23	65.7	37	23.9	138	41.3
Lack of market facility	6	6.9	2	3.5	2	5.7	1	0.6	11	3.3
Lack of knowledge	26	29.9	24	42.1	10	28.6	105	67.7	165	49.4
Not a practice	1	1.1	2	3.5	0	0.0	9	5.8	12	3.6

7.7 Market Price Information

	Gauradaha (n=87)		Gauradaha Gauriganj (n=87) (n=57)		Kamal (n=35)		Shivasatakshi (n=155)		Total (n=334)		
	Number	%	Number	%	Number	%	Number	%	Number	%	
Model SC/TC	9	90.0	10	100.0	10	100.0	10	100.0	39	97.5	
Model SC	7	100.0	2	100.0	6	100.0	10	100.0	25	100.0	
Non-Model	68	97.1	31	68.9	17	89.5	86	63.7	202	75.1	
Overall	84	96.6	43	75.4	33	94.3	106	68.4	266	79.6	

Table 7.7-1 Percentage of Collection of Market Price Information

	$\frac{140107.7-2}{6000000000000000000000000000000000000$		Conte				Shiyasatakshi(n-155		Total $(n-324)$	
	Gaurad	aha(n=87)	Gauri	$igan_j(n=57)$	Kar	nal(n=35)	Shivasata	akshi(n=155)	Total(1	n=334)
	No	%	No	%	No	%	No	%	No	%
Model SC/TC										
Neighbours/Relatives	8	80.0	8	80.0	8	80.0	10	100.0	34	85.0
Radio FM	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Shops in village	4	40.0	1	10.0	2	20.0	2	20.0	9	22.5
Mobile Phone	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Newspaper	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Trader/ Retailers in market	7	70.0	9	90.0	10	100.0	8	80.0	34	85.0
TV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Trader coming to village	2	20.0	0	0.0	1	10.0	0	0.0	3	7.5
Government officials/ Extension officer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Model SC										
Neighbours/Relatives	6	85.7	2	100.0	5	83.3	10	100.0	23	92.0
Radio FM	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Shops in village	1	14.3	0	0.0	2	33.3	0	0.0	3	12.0
Mobile Phone	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Newspaper	0	0.0	0	0.0	0	0.0	1	10.0	1	4.0
Trader/ Retailers in market	5	71.4	2	100.0	5	83.3	10	100.0	22	88.0
TV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Trader coming to village	1	14.3	0	0.0	0	0.0	0	0.0	1	4.0
Government officials/ Extension officer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Non-Model										
Neighbours/Relatives	46	65.7	24	53.3	15	78.9	75	55.6	160	59.5
Radio FM	0	0.0	0	0.0	0	0.0	12	8.9	12	4.5
Shops in village	13	18.6	0	0.0	4	21.1	2	1.5	19	7.1
Mobile Phone	2	2.9	0	0.0	0	0.0	0	0.0	2	0.7
Newspaper	0	0.0	0	0.0	0	0.0	1	0.7	1	0.4

 Table 7.7-2
 Collection of Market Price Information

	Gauradaha(n=87)		Gauriganj(n=57)		Kai	mal(n=35)	Shivasata	akshi(n=155)	Total(n=334)	
	No	%	No	%	No	%	No	%	No	%
Trader/ Retailers in market	66	94.3	29	64.4	17	89.5	84	62.2	196	72.9
TV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Trader coming to village	5	7.1	0	0.0	0	0.0	1	0.7	6	2.2
Government officials/ Extension officer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Overall										
Neighbours/Relatives	60	69.0	34	59.6	28	80.0	95	61.3	217	65.0
Radio FM	0	0.0	0	0.0	0	0.0	12	7.7	12	3.6
Village shops	18	20.7	1	1.8	8	22.9	4	2.6	31	9.3
Mobile Phone	2	2.3	0	0.0	0	0.0	0	0.0	2	0.6
Newspaper	0	0.0	0	0.0	0	0.0	2	1.3	2	0.6
Trader/ Retailers in market	86	98.9	40	70.2	33	94.3	103	66.5	263	78.7
TV	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Government officials/ Extension officer	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

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