NATIONAL IRRIGATION ADMINISTRATION

Consulting Services for the Feasibility Study of the Proposed Ilocos Sur Irrigation Projects (Ilocos Sur Transbasin Project & Upper Banaoang Irrigation Project)

PROJECT DESCRIPTION FOR SCOPING
(ILOCOS SUR TRANSBASIN PROJECT)

October 2018

WOODFIELDS CONSULTANTS, INC.
A Planning and Engineering Consulting Firm
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0	22 June 2018	Project Description for Scoping	Kristine Ann S. Martinez Project Manager	Previously signed
1	05 October 2018	Project Description for Scoping	Kristine Ann S. Martinez Project Manager	

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CHAPTER 1
BASIC PROJECT INFORMATION

1.1 Project Information

Name of Project	:	Feasibility of the Proposed Ilocos Sur Irrigation Projects (Ilocos Sur Transbasin Project & Upper Banaoang Irrigation Project)
Location	:	Ilocos Sur (Ilocos Sur Transbasin Project): • Brgy. Malideg, Quirino (Proposed Abra River Diversion Dam) • Brgy. Alfonso, Gregorio del Pilar (Transbasin Tunnel Outlet and Bifurcation) • Brgy. Paltoc, San Emilio (Transbasin Tunnel Outlet and Powerhouse) • Brgy. Bequi-Walin, Lidlidda (Proposed Sta Maria Diversion Dam)
Nature of Project	:	Dam, Irrigation and Hydropower Facilities Project, Feasibility Study
Size / Scale	:	• Inundated area: 73 hectares (maximum flood) • Water storage: 0.4 million cubic meters (mcm) • Service area: about 10,000 hectares • Hydropower plant's maximum output: 6.5 MW • Dependable capacity: 2.5 MW (for Ilocos Sur Transbasin Project only)

1.2 Proponent Profile

Name of Proponent	:	National Irrigation Administration (NIA) Regional Office 1
Address	:	Ambrosio Street, Brgy. Bayaoas, Urdaneta City, 2428, Pangasinan
Authorized Representative	:	Engr. Vicente R. Vicmudo, Ph.D./ Leonila G. Fernandez Regional Irrigation Manager/ Principal Engineer C
Contact Details	:	Telephone No. : (075) 568-2308 Mobile No.: (+63) 922-867-9689 Email Address: leonilafernandez16@yahoo.com; niarinoffice@yahoo.com;niaregion1pso@gmail.com

CHAPTER 2
PROJECT DESCRIPTION

2.1 Project Location and Area

The proposed Ilocos Sur Irrigation Project (ISIP) will be located in Ilocos Sur, one of the provinces comprising Region I in Luzon Island. It has two sub-projects: the Ilocos Transbasin Project and Upper Banaoang Irrigation Project. This Project Description for Scoping (PDS) Report is intended for the Ilocos Transbasin Project.

The source of water for the proposed Ilocos Transbasin Project is the Abra River in Sitio Eteb, Brgy. Malideg in the Municipality of Quirino, Ilocos Sur. A diversion dam located about 630 meters downstream from the Sitio Eteb will be constructed to divert the water to the conveyance tunnel. The tunnel will have two (2) outlets. The first outlet will be located in Brgy. Alfonso, Municipality of Gregorio del Pilar and will supply water to Cangao River, a tributary of the Buaya River to the existing diversion dam of Santa Lucia-Candon River Irrigation System (RIS). Meanwhile, the tunnel will continue northwest and a second outlet located in Brgy. Paltoc, Municipality of San Emilio shall discharge water into the Dayouan River, an upstream tributary of the Santa Maria River where it will pass through a hydroelectric power plant before supplying the existing diversion dam of the Santa Maria-Burgos RIS.

The total existing service areas of the Santa Maria-Burgos RIS and Santa Lucia-Candon RIS is 1,738 hectares, as per the December 2015 inventory done by NIA Ilocos Sur Irrigation Management Office. This area includes the City of Candon and the Municipalities of Santa Lucia, Santa Maria, Burgos and Sta Cruz. With the proposed Ilocos Transbasin Project, the potential service areas for Santa Lucia-Candon and Santa Maria-Burgos Irrigation Systems are estimated at 5,000 hectares and 6,020 hectares, respectively. The additional potential irrigable areas will include portions of the Municipalities of Santiago, Banayoyo, Galimuyod, Salcedo, Narvacan, Nagbukel and Lidlidda.

The location of the project, its service areas and components are shown in **Figure 2.1-1**.

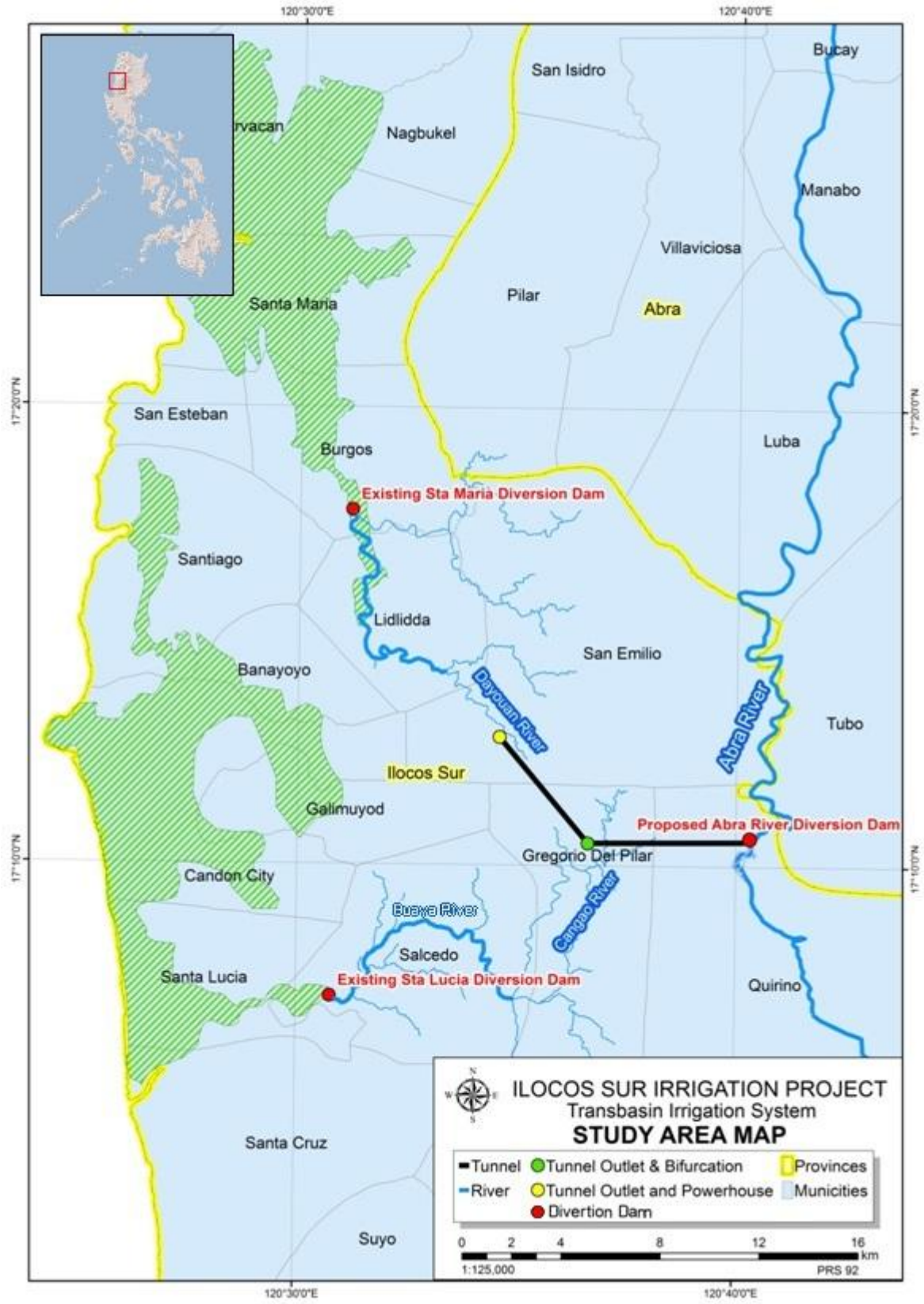

Figure 2-1
Project Location of Ilocos Sur Transbasin Project

2.2 Project Rationale

Agriculture is one of the major sectors of economy that contributes to gross domestic product (GDP) and one of the primary objectives of the Government is to increase self-sufficiency in rice. In order to attain this, there is a need to increase in rice production through the expansion of irrigated areas.

The establishment of ISIP results in the improvement of food security which corollary increases rural income by enhancing farm productivity. The project focus on rice production is expected to complement the Government's Food Staples Self-Sufficiency Program (FSSP).

ISIP also includes enhancing the performance of the irrigation sector and enables development in energy sector. The power generation component of the project will also help in meeting the demand in the Luzon power grid.

The Feasibility Studies for the Ilocos Sur Transbasin Project and Upper Banaoang Irrigation Project integrated into one project titled "*Ilocos Sur Irrigation Project (ISIP)*" has been conducted through the General Appropriations Act (GAA) for FY 2015. This shall be implemented by the NIA Regional Office 1, which is in accordance with the current Delegation of Authorities.

The general objective of the project is to conduct feasibility study on the proposed ISIP. It shall cover technical, financial aspects of proposed irrigation project, including environmental study, vulnerability assessment, preparation of sustainability plans, and analysis of alternative financing schemes. The Feasibility Study (FS) shall ensure that Value Analysis/Value Engineering (VA/VE) is undertaken for best possible options.

2.3 Project Components

The Ilocos Sur Transbasin Project consists of six (6) main components. **Table 2.3-1** shows the project components and its corresponding descriptions while the locations of these components were already presented in **Figure 2-1**.

Table 2.3-1
Components of the Ilocos Sur Transbasin Project

	Component	Description
1	Diversion Works at Abra River	It is located about 630 meters (m) downstream from Sitio Eteb, Bgy. Malideg, Quirino. The riverbed elevation at the diversion site is about 248 meters above sea level (masl) and the drainage area is about 982 square kilometers (km^2). The diversion works consist of a 150 m long concrete diversion weir crossing the whole river width. The weir is designed for a flood flow of 7,020 cubic meter per second (cms) having a probable frequency of 100 years and a corresponding freeboard of 2.57 m. The diversion weir is followed by a stilling basin on concrete apron to dissipate the kinetic energy of the water discharging over the weir by means of hydraulic jump. The stilling basin of the diversion weir provided with a length of 40.0 m at elevation 246.050 masl with a thickness of 0.8 m – 1.20 m followed by a layer of 0.20m thick gravel blanket with 0.60m thick boulders on top. Sluiceways are located on the left bank, between the diversion weir and the intake structure, to prevent sediments from entering the

	Component	Description
		intake works and to help in maintaining a channel to the intake works. Sluiceways are controlled by two slide gates, followed by a concrete channel, and provided with stop log grooves for repair and closure in case of damage to the gates. The intake works located on the left bank are designed for a discharge of 9.0 cms and will control and regulate the flow entering the transbasin tunnel by means of two constant downstream level gates. These gates are preceded by trashracks and emergency slide gates and are followed by two settling basins for suspended material removal. Two stilling basins are also provided after the gates to reduce the turbulence of the flow entering the settling basins.
2	Transbasin Tunnel	The transbasin tunnel is a free-flow conduit designed to carry a designed discharge of 9.4 cms diverted from the Abra River to the adjacent watersheds of the Buaya and Santa Maria Rivers. The first stretch from the Abra River to the Cangao River (a tributary of Buaya River) has a length 6,135 m, while the second stretch up to the Dayouan River (atributary of the Santa Maria River) has a length of 6,915 m. The total tunnel length is 13,050 m. The tunnel section is concrete lined for an average thickness of 25 centimeters (cm). The diameter of the adopted horseshoe section is 2.7 m corresponding to a minimum excavation section of about 9 square meters (m^2). The outlet works at the Cangao River and Dayouan River are located near Bgy. Alfonso, Municipality of Gregorio del Pilar and Bgy. Paltoc, Municipality of San Emilio, respectively. The tunnel outlet in Cangao River will be controlled by a constant downstream level gate followed by a series of slide gates.
3	Power Plant at the Dayouan River	The design discharge of the power plant is 9.0 cms, while the minimum discharge and the annual average discharge are estimated at 3.8 cms and 7.8 cms respectively. The net head ranges between 85.8 m and 87.6 m. The headpond is a concrete structure which conveys the water from the transbasin tunnel to the penstock. The penstock, which is a 375 m long single steel with a diameter of about 1.80 m, connects the headpond to the powerhouse. This will be controlled by a butterfly valve to provide automatic closure in case of turbine runaway or penstock failure. Before entering the powerhouse, the penstock terminates in two branches, the first one feeding the turbine and the second the irrigation bypass. The powerhouse includes the machine hall housing the equipment and the control and service area. A three-phase synchronous generator will be directly coupled to the horizontal shaft Francis Type Turbine. The unit will be connected to the step-up power transformer 13.8/69 kilovolts (KV) located in the adjacent switchyard. The irrigation bypass will be controlled by a butterfly valve. The powerhouse will be equipped with an overhead travelling crane and a small diesel generating set for the station service. The transmission line is a conventional 69 KV line according to the National Power Corporation (NPC) standards; utilizing single-pole cross-arms locally manufactured with suspension insulators, aluminum conductor steel-reinforced cable (ACSR) phase

	Component	Description
		conductors, and galvanized steel shield wire.
4	Diversion works at the Santa Maria River	The site is located near Bgy. Bequi-Walin, about 1.2 km upstream of the existing diversion works. The proposed works consist of a diversion weir, 70 m long, crossing the river channel and part of the alluvial terrace on the left side. The weir is designed for a flood flow of 640 cms having a probable frequency of 100 years and an adopted freeboard of1.53 m. Sluiceways are proposed on the left bank, between the diversion weir and the irrigation head works. Sluiceways opening are controlled by two slide gates, provided withstop log grooves followed by a concrete channel. The diversion weir is followed by a stilling basin to dissipate the kinetic energy of the water discharging over the weir by means of hydraulic jump. The alluvial terrace between the diversion works and the left bank will be closed by a dike about 300 m long. Headworks are designed for a discharge of 7.9 cms and are controlled by two constant level gates preceded by trashrack and emergency slide gates. Stilling basins are provided after the gates to reduce the turbulence of the water entering the subsequent settling basins which are provided for suspended material removal.
5	Diversion works at the Buaya River	At present, these works are being rehabilitated under National Irrigation Sector Rehabilitation and Improvement Project (NISRIP) project. It is assumed that the future diversion works will be constructed at the existing site following the same design criteria set for the Santa Maria diversion works.
6	Irrigation and drainage systems	The initial stretch of the main canal, up to the existing headworks will serve the whole Santa Maria irrigation area with a discharge of 7.9 cms. The proposed main canal has a total length of 33.3 km while the 20 laterals and sublaterals which constitute the secondary conveyance works have a total length of 58.3 km.

2.4 Project Alternatives

Several considerations—such as the social situation, location, environment, and financial viability—were taken into account upon the conclusion of the Project scheme. Based on the said factors, four (4) schemes were generated and listed in **Table 2.4-1**. Among the four (4) options, the chosen scheme was deemed the most pragmatic due to its viability, effectivity, and cost-efficiency.

Table 2.4-1
Project Alternatives

Project Schemes	Description	No. of Service Area	Outlet	Hydropower Component
Option 1	• Concrete Ogee Diversion Dam and Lined Canal ○ with Bifurcation ○ without Power Component	1. Supplemental supply for Santa Lucia Irrigation System (IS) / Buaya Area 2. Santa Maria IS / Santa Maria Area	• Cangao River • Dayouan River	No
Option 2	• Concrete Ogee Diversion Dam and Lined Canal ○ with Bifurcation ○ with Power Component	1. Supplemental supply for Santa Lucia Irrigation System (IS) / Buaya Area 2. Santa Maria IS / Santa Maria Area	• Cangao River • Dayouan River	Yes
Option 3	• Concrete Ogee Diversion Dam and Lined Canal ○ without Bifurcation ○ with Power Component	1. Santa Maria IS / Santa Maria Area	• Dayouan River	Yes
Option 4	• Concrete Ogee Diversion Dam and Lined Canal ○ without Bifurcation ○ without Power Component	1. Santa Maria IS / Santa Maria Area	• Dayouan River	No

2.5 Present Condition of the Project Sites

Site assessment was conducted to assess the current situation of the proposed project location. Aerial photos of the site are presented from **Figure 2-2** to **Figure 2-5** .

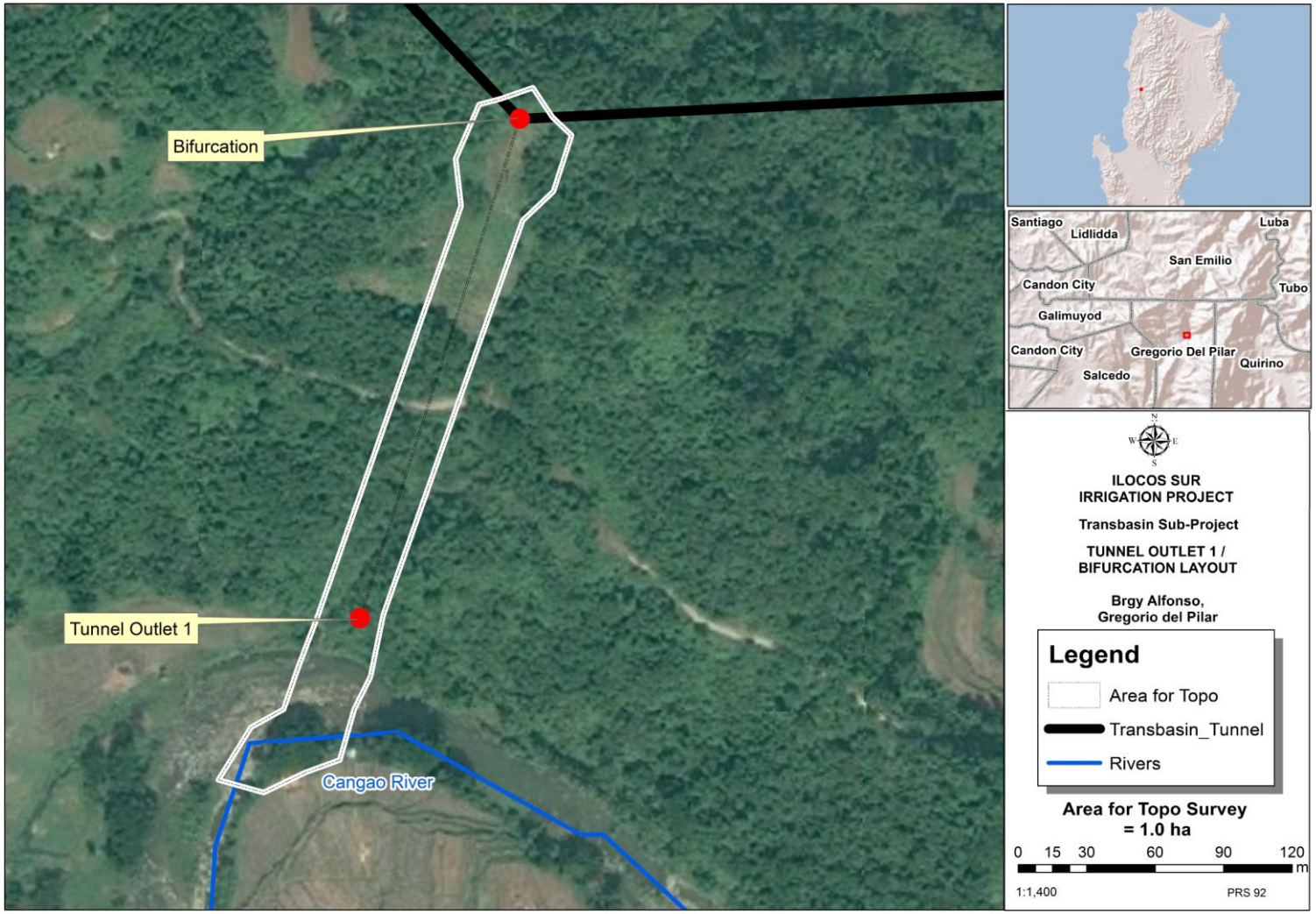

Figure 2-2
Tunnel Outlet 1 - Bifurcation Layout

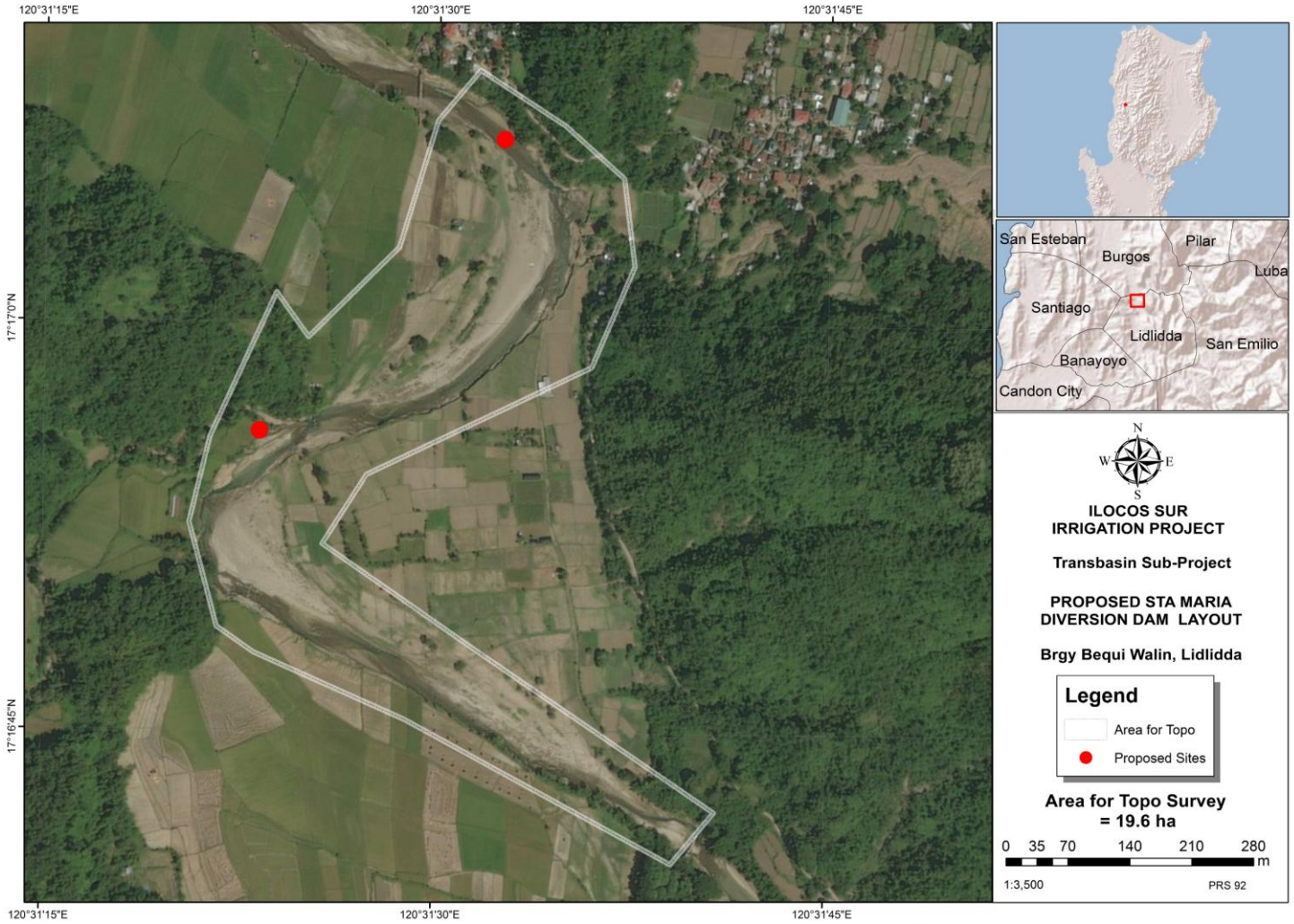

Figure 2-3
Proposed Sta. Maria Diversion Dam Layout

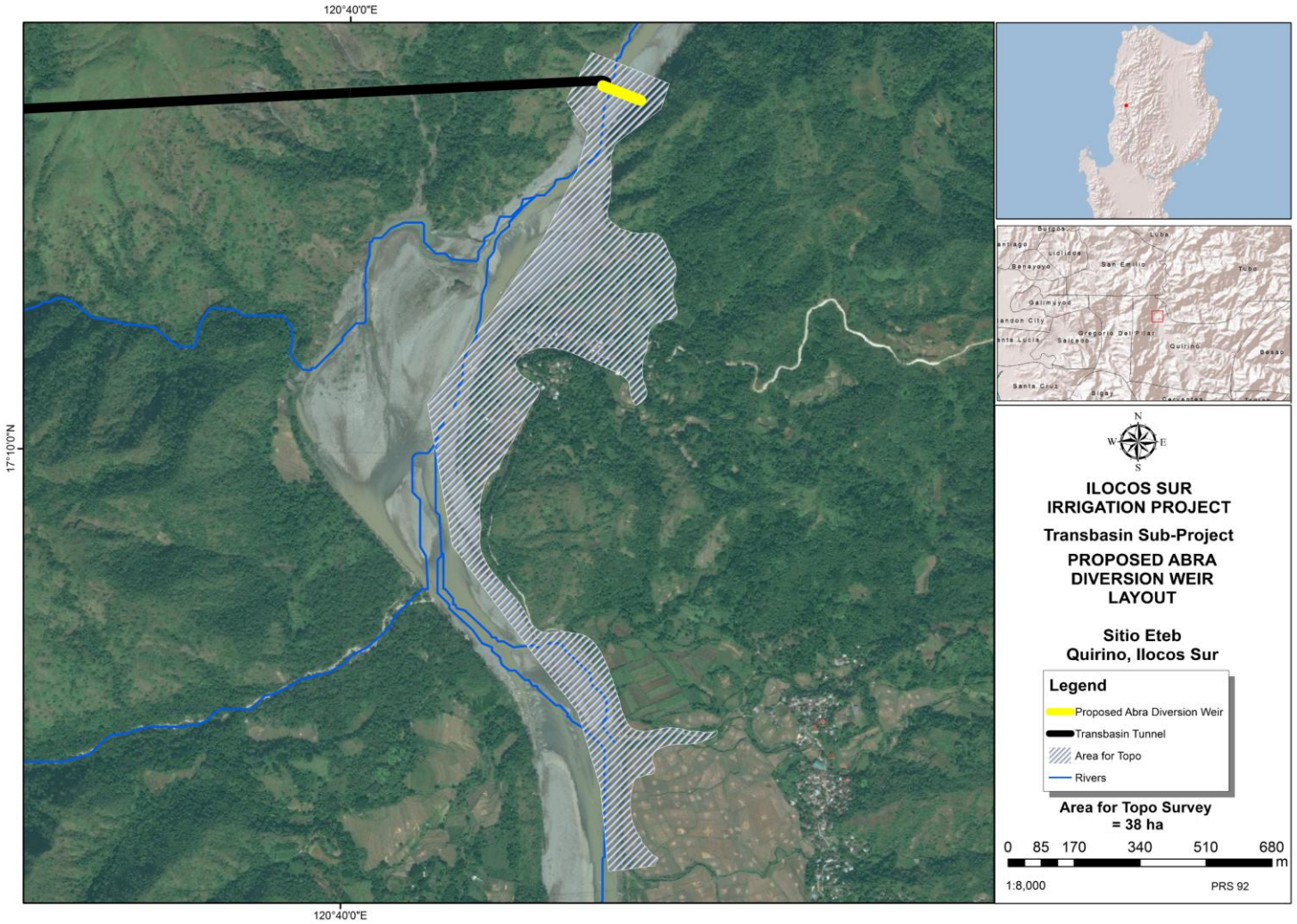

Figure 2-4
Proposed Abra Diversion Weir Layout

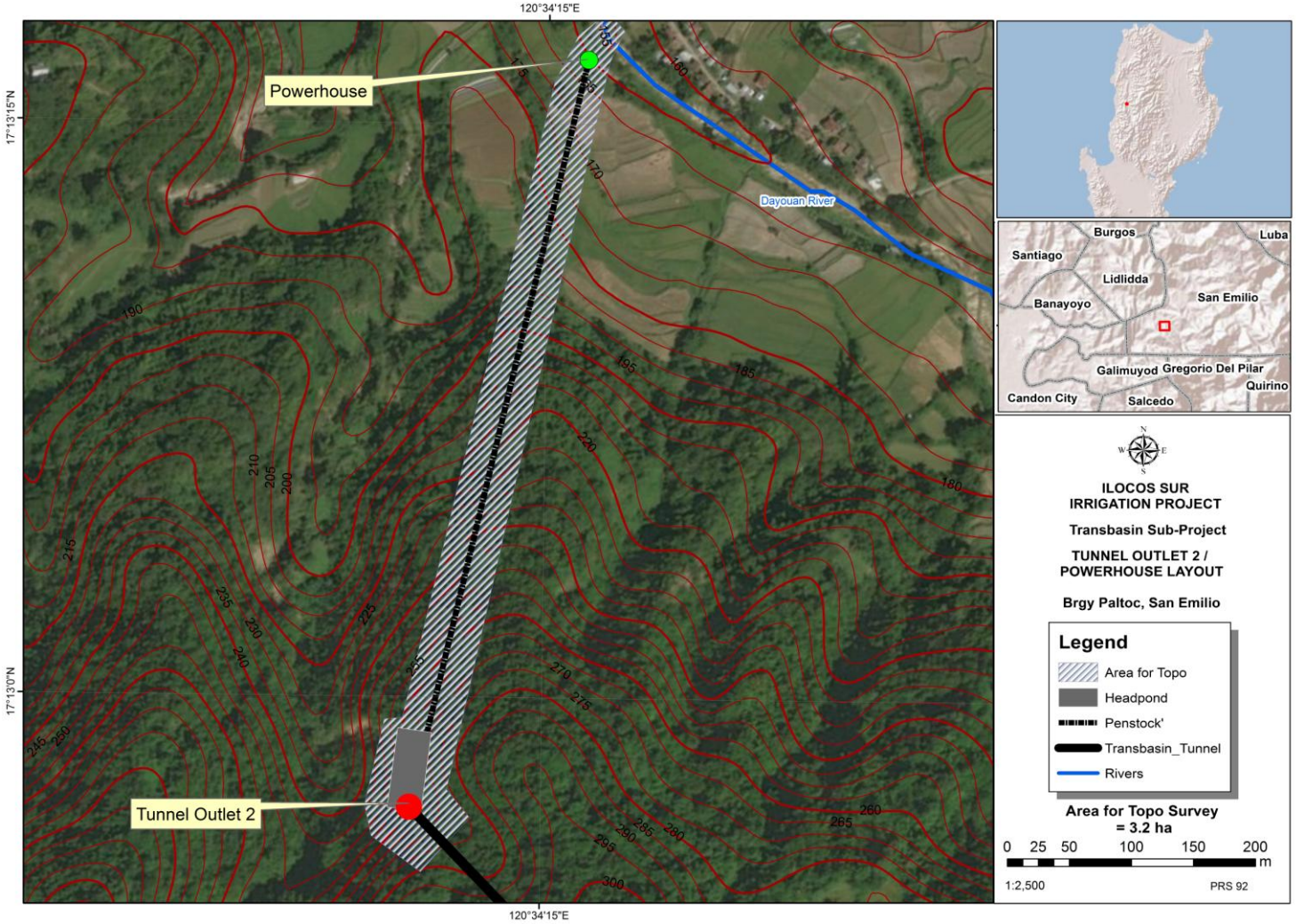

Figure 2-5
Proposed Tunnel Outlet 2 - Powerhouse Layout

2.5.1 Water Quality

Based on DENR Memorandum Circular 1993-07, Abra River in Ilocos Sur is currently classified by Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB) as Class A (Public Water Supply Class II, intended for sources of water supply requiring conventional treatment (coagulation, sedimentation, filtration, and disinfection) to meet the latest Philippine National Standards for Drinking Water (PNSDW) 2017.

According to Dulay (2005) in a study titled "The Abra River System Water Quality Monitoring", the water quality of Abra River has deteriorated over the years due to human-related activities such as mining, effluents from domestic and industrial sources, and deforestation in the upland area. This study shows that the concentration of nitrates, cyanides, and heavy metals including mercury, lead, and chromium are higher than the acceptable standards. Due to pollution, Abra River is no longer suited for domestic use.

2.5.2 Freshwater Ecology

The Abra River and its tributaries are said to be rich in aquatic resources wherein some species are considered endemic. Fish species present in the river include 'bunog', 'karpa', 'palilleng', 'igat', 'kampa' and the endemic fish called 'ludong'. Other aquatic organisms identified are common shells 'Agurong', 'bennek', 'bisukol', 'leddeg' and 'suso'), crustaceans ('Kuros' and crabs) and aquatic plants ('pakko' and 'baktel') (FAO, 2009).

In the publication of the Save the Abra River Movement (STARM) in 2004, there are 13 endemic and four introduced species that are present in the river ecosystem as shown in **Table 2.5-1**. Meanwhile, the existing structures and the surrounding environment of the project sites are presented in
Figure 2-6.

Table 2.5-1
Aquatic Species Present in Abra River

Local/ Common name	Scientific name	Species composition
Carpa/Milkfish	*Cayprinus carpio*	Introduced
Crabs	*Carcinedes maenas*	Endemic
Damselflies	*Argia sp.*	Endemic
Diving beetle	*Scarabaeus sp.*	Endemic
Dragonflies	*Anaijunius*	Endemic
Eel	*Anguila rostrata*	Endemic
Fishflies	*Corydaluz sp.*	Endemic
Frog	*Rana sp.*	Endemic
Goby	*Globius sp.*	Endemic
Leech	*Glossiphonia sp.*	Endemic
Mayflies	*Leptophlebia sp.*	Endemic
Shrimp	*Penaeus sp.*	Introduced
Snail (Golden)	*Kelisome sp.*	Introduced
Stoneflies	*Brachyptera sp.*	Endemic
Tilapia	*Tilapia nilotica*	Introduced
Turtle	*Chaelydra serpentine*	Endemic
Water scavenger beetle	*Hydrophilus triangularis*	Endemic

Source: Save the Abra River Movement (STARM), 2004

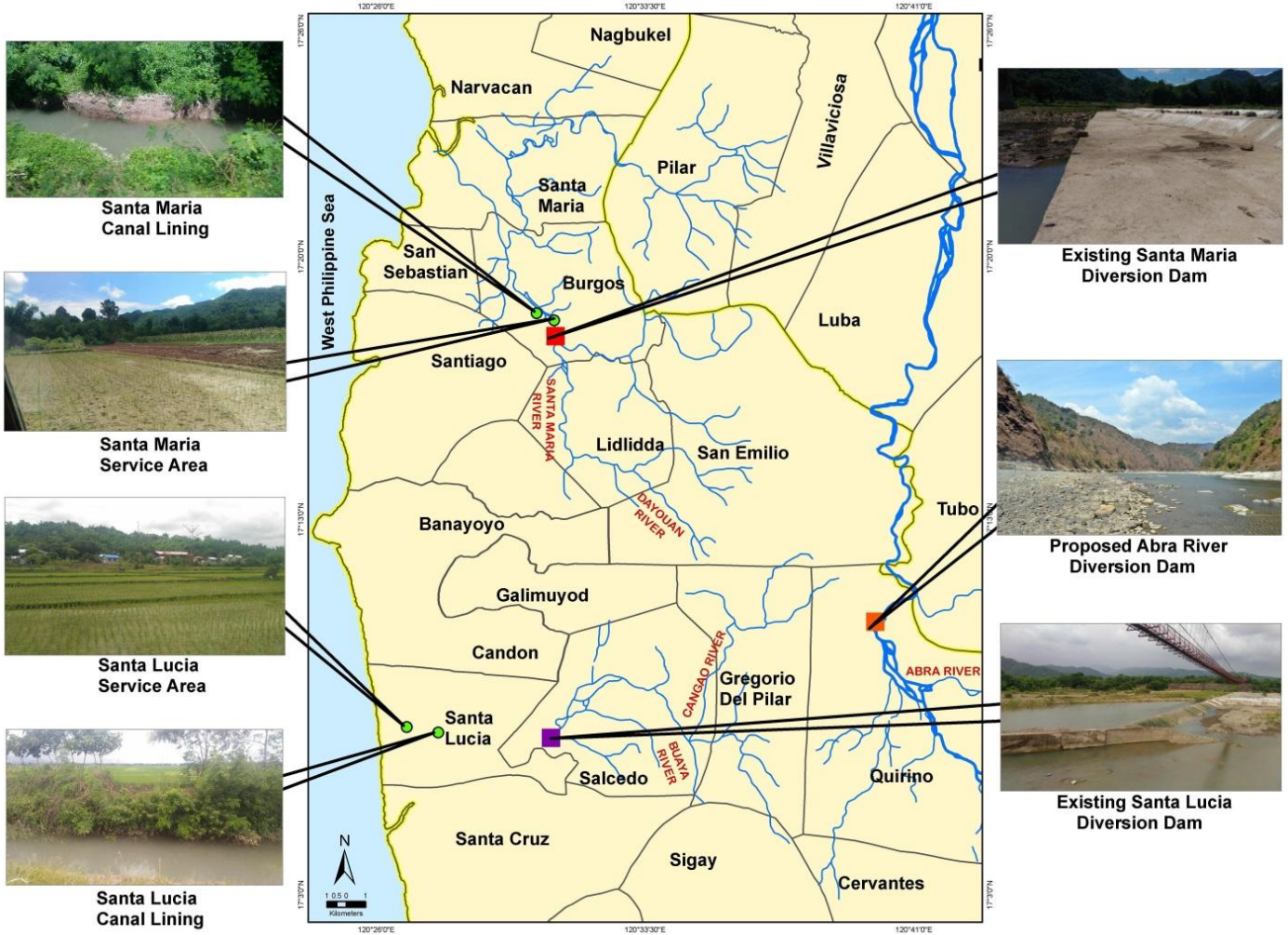

Figure 2-6
Present Condition of the Project Site

2.6 Project Phases, Key Environmental Aspects, Wastes, Issues, Built-in Measures

Table 2.6-1 summarizes the key environmental aspects, anticipated wastes and proposed mitigating measures during the different project phases.

Table 2.6-1
Key Environmental Aspects during the Different Project Phases

Activities/ Areas of Concern	General Issues/Impacts	Generalized Mitigation Measures/ Controls
Pre-construction Phase		
Acquisition of necessary documents/ permits prior to construction and operation of the project. Among these are Environmental Compliance Certificate (ECC), construction permits, tree cutting permit, and other required permits/documents before construction.	Fears and apprehensions of the community about the project	Structured Information, Education and Communication (IEC) Campaign Regular meetings and coordination with project stakeholders
Land acquisition for the proposed transbasin project	Compensation issues and concerns	Identification of ownership status Agreement between the owner and proponent will be made In case of displacement, compensation package based on existing laws and regulations will be provided
Construction Phase		
Construction of the Project components	Possible impact on rivers from erosion and sedimentation Potential effects on aquatic biota associated with water quality impacts Possible erosion along disturbed slopes and exposed soil surface Possible impact on soils from vehicle and machine fuel spills Solid and liquid waste management issues Possible increase of vehicle exhaust emissions in roadways and dust suspension in disturbed and exposed soil surfaces	Proper housekeeping Provision of hygiene and sanitary facilities Enforcement of a solid and liquid waste management plan Employment of appropriate soil erosion control measures Suppression of road dust with water, as necessary on a regular basis. Drivers will be educated on the effects of vehicular speed on dust generation. Speed limits will be enforced by the company. Enforcement of proper management practices for the handling of fuels and oils Heavy equipment will be appropriately muffled. Workers

Activities/ Areas of Concern	General Issues/Impacts	Generalized Mitigation Measures/ Controls
	Noise and vibration generation from vehicle during earth-moving activities Increase in traffic flow Potential removal of wildlife habitat covered by the project Employment opportunities; influx of migrants Workers' health and safety	operating heavy equipment will be provided with appropriate PPE, as necessary. Development activities shall be limited to the proposed project area Preferential local hiring policy Implementation of health and safety standards IEC regarding social hygiene and community health
Operation Phase		
Operation of the hydropower plant	Injuries or death of fish and other aquatic organisms from the turbine Reservoir water becomes more stagnant and may contain higher levels of sediments and nutrients leading to increase in algae and weeds	Installation of intake screen Manual harvesting or introduction of fish to minimize proliferation of algae and weeds
Irrigated farmlands	Increase in production and yield Alleviation of poverty/Increase quality of life	
Closure and Decommissioning Phase		
Rehabilitation of the area	Non-completion of the rehabilitation/ inappropriate land-use	Progressive rehabilitation strategy

2.7 Project Cost and Duration

Preliminary costing of selected option is being considered for Ilocos Transbasin Irrigation Project at Abra River diversion works as in **Table 2.7-1.**

Table 2.7-1
Indicative Cost for Ilocos Sur Transbasin Project

Description	Total cost
1. General requirements	**284,705,224.62**
2. Civil works	**5,694,104,492.36**
A. Diversion and care of river	*20,000,000.00*
B. Construction of diversion dam	
B1. Construction of diversion dam at abra river	*255,390,524.62*
B2. Sta. Maria diversion dam	*33,421,049.15*
C. Construction of diversion tunnel and penstock	*3,687,263,089.24*
D. Construction of canal	
D1. Concrete lined canal (main canal)	*521537510.6*
D2. Laterals	*139986747.4*
E. Construction of structures	
E1. Structures (main canal)	*22242617*
E2. Structures (laterals)	*4180568*
F. Terminal facilities	*11,593,617.00*
G. Construction of drainage and canal system	
G1. Drainage canal system	*17980502*
G2. Farm drainage system	*12221492*
H. Road network	*19,269,360.00*
I. Minor works (10%)	*474,508,707.70*
J. Physical contingency (10%)	*474,508,707.70*
Total construction cost	**5,978,809,716.98**

Table 2.7-2 shows the indicative project schedule indicating the major activities and duration of each activity.

Table 2.7-2
Work Plan and Implementation Schedule

Work item	Construction year															
	Y 0				Y 1				Y 2				Y 3			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Preconstruction activities	■	■	■	■												
Mobilization and demobilization				■	■											■
Diversion and care of river during construction and unwatering foundation					■	■	■	■								
Construction of diversion weir						■	■	■	■	■	■	■	■	■	■	
Foundation treatment (curtain grouting)									■	■	■	■				
Construction of tunnel									■	■	■					
Construction of irrigation canal and service road						■	■	■	■	■	■	■	■	■	■	
Conduct of environmental activities					■	■	■	■	■	■	■	■	■	■	■	■

CHAPTER 3
SOCIAL PREPARATION ACTIVITIES

This chapter summarizes the social preparatory activities conducted for the proposed ISIP Transbasin Project in accordance with the DAO 2017-15 (guidelines on public participation under the PEISS).

3.1 Information, Education and Communication Activity

As part of the social preparation activities, a series of IEC activities in the form of Focus Group Discussions (FGDs) and courtesy meetings have been conducted to inform the stakeholders and the LGU officials about the project. The timeline of the LGU visits for the IEC activities is summarized in **Table 3.1-1.** The proceedings during each FGDs are presented in **Annex 1**. Prior to the scheduled IEC activity, set of request letters were delivered to the respective LGUs of which the received copies are presented in **Annex 2.** To further the information dissemination about the project to the people, IEC materials were distributed (**Annex 3**). Lastly, **Annex 4** presents the attendance sheets and the signatures of some of stakeholders who received the IEC materials.

Table 3.1-1
Timeline of IEC activities

Date	Time	Venue	Photo
02 April 2018	2:00 PM to 4:00 PM	Office of the Irrigator's Association-Sta. Maria, Burgos	
03 April 2018	10:30 AM to 11:30 AM	Municipality of Gregorio del Pilar, Province of Ilocos Sur	

Date	Time	Venue	Photo
03 April 2018	3:00 PM to 4:00 PM	National Irrigation Administration-Sta. Lucia Office	
04 April 2018	10:30 AM to 11:30 AM	Municipality of San Emilio, Province of Ilocos Sur	
04 April 2018	2:00 PM to 4:00 PM	Municipality of Lidlidda, Province of Ilocos Sur	

Date	Time	Venue	Photo
05 April 2018	10:30 AM to 11:45 AM	Municipality of Quirino, Province of Ilocos Sur	

3.2 Initial Perception Survey

To obtain the initial perception of the project-affected barangay residents on the Ilocos Transbasin Project, a house-to-house perception survey was conducted from 28 August to 3 September 2018. To calculate for the sample size of the respondents, Sloven's formula was applied to the 2015 population (PSA, 2015) of the project-affected barangays using 90% confidence interval and 10% margin of error. A total of 126 respondents were interviewed, distributed among the project-affected barangays (see **Table 3.2-1** for the sample size per barangay).

Table 3.2-1
Sample Size for Perception Survey

Municipality	Barangay	Sample size	Distribution (Barangay)	Distribution (Municipality)
Gregorio del Pilar	Alfonso	21	16.67	32.54
	Poblacion Norte	20	15.87	
Quirino	Cayus	20	15.87	31.75
	Malideg	20	15.87	
San Emilio	Paltoc	15	11.90	23.81
	San Miliano	15	11.90	
Lidlidda	Bequi-Walin	15	11.90	11.90
TOTAL		***126***	***100.00***	***100.00***

3.2.1 Demographic Profile of Respondents

In terms of demography, majority of the respondents are aged 18 to 40 years old (45%) followed by 41 to 60 years old (40%). No participants aging below 18 years old were taken while only four participants did not disclose their age (3.17%) (see **Figure 3-1**). Meanwhile, majority of the respondents are female (60%; see **Figure 3-2**).

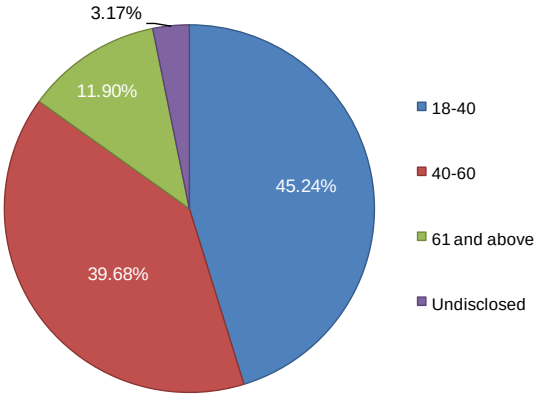

Figure 3-1
Age of Respondents

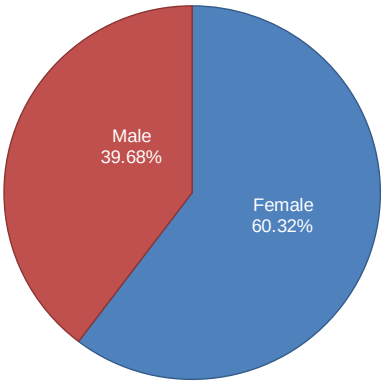

Figure 3-2
Gender of Respondents

Most of the respondents are married (83%) while only 9% are single. Very small portion of the respondents are either widowed, annulled/legally separated or lived-in (8%) (**Figure 3-3**).

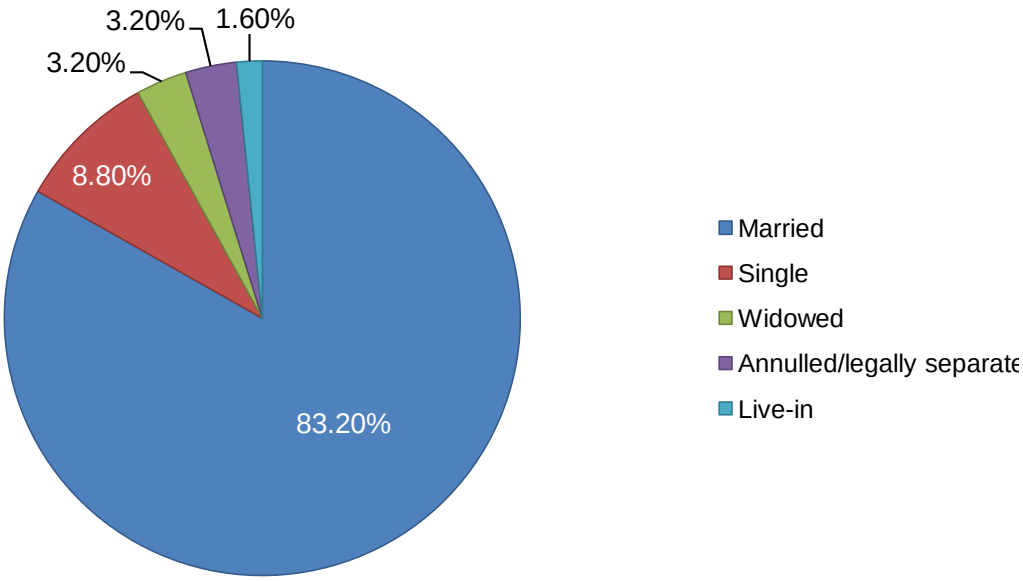

Figure 3-3
Civil Status of Respondents

As presented in **Figure 3-4**, about 60% of the respondents originate from Ilocos Sur. Meanwhile, about 26% are from Abra; 2% are from La Union while the rest of the respondents are from different parts of the country (11.42%) including Baguio, Benguet, Mountain Province, Pangasinan, Bataan, Bontoc, Ilocos Norte, Lingayen, Bacolod, Agusan del .Sur, North Cotabato, Surigao del Norte and Visayas.

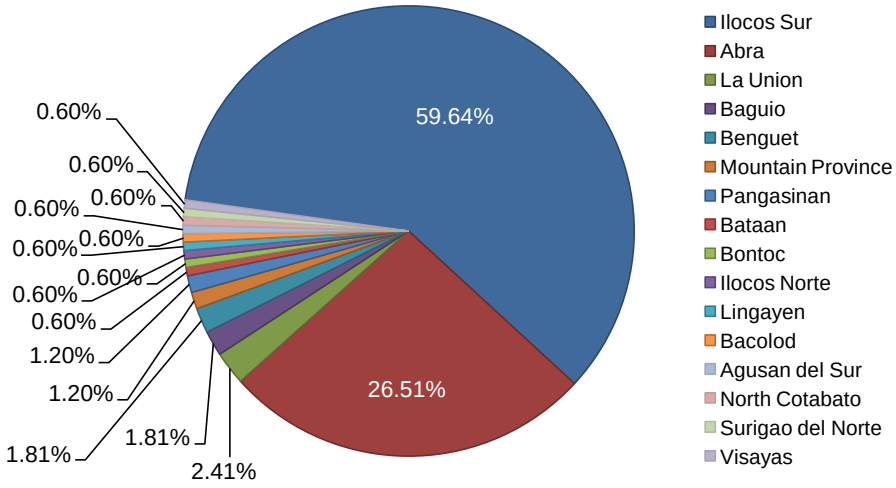

Figure 3-4
Place of Birth of Respondents

Roman Catholicism is the primary religion practiced within the area (48%) followed by the Pentecostals (21%) and Seventh Day Adventists (13%). Correspondingly, 6% of the interviewees are under the Assembly of God, 4% are under the United Church of Christ in the Philippines (UCCP) and 3% are Christians (**Figure 3-5**). Accordingly, 1% of the respondents comprise each of the following religions: IPIG, Church of God, Methodist, and Protestant. Only 2% of the respondents did not identify themselves under any given religion.

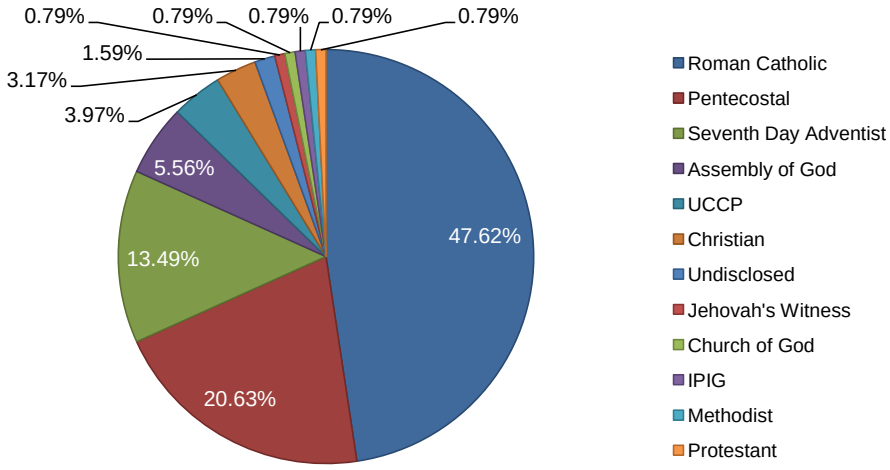

Figure 3-5
Religion of Respondents

Consequently, most of the respondents (50%) reportedly belong to the Bag-o ethnic group, followed by Ilocanos (30%). Interviewees that distinguish themselves as part of the Tingguian or Itneg reach 7%, and those from Kankanaey ethnic group form 6% of the sample size, while respondents from Tingguian reach 4%. Those from Igorot reach 3%, with the least number of people (1%) classifying themselves as Manobos or as tribal women (**Figure 3-6**).

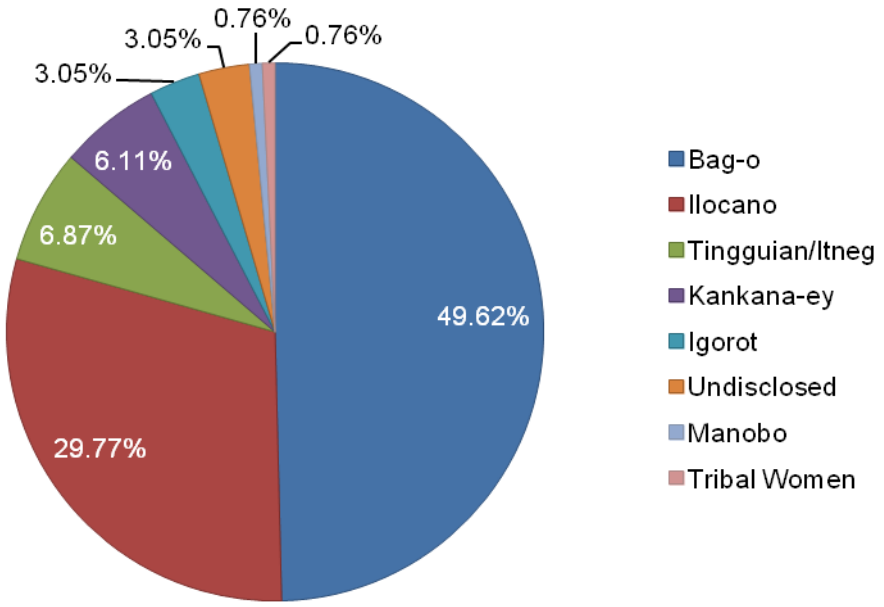

Figure 3-6
Ethnic Affiliation of Respondents

Furthermore, in terms of the years of stay in their current residence, most of the respondents have been staying in the area for more than 10 years already (76.98%) while about 20.64% have been residing between 1 to 10 years. Only 2.38% are said to be new to the area (see **Figure 3-7**).

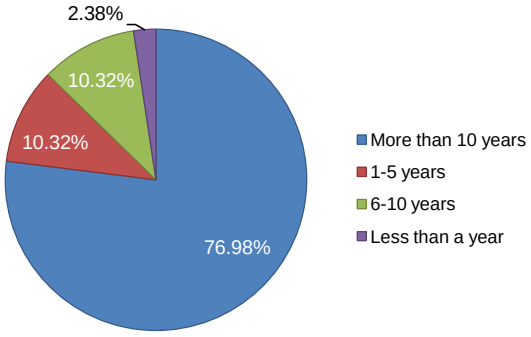

Figure 3-7
Years of Residence of the Respondents

Regarding the educational level attained by the respondents, the survey results (in **Figure 3-8)** show that most of the interviewees (40%) have attended high school while 30% have reached tertiary level of education. About 25% of the respondents have gone to elementary school while about 6% attended vocational studies.

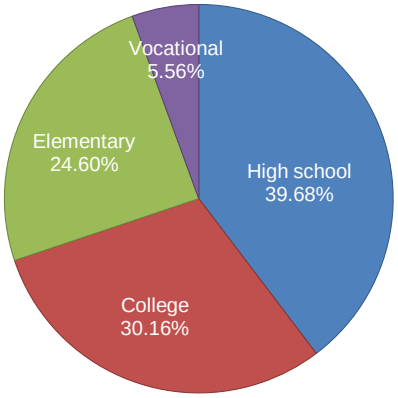

Figure 3-8
Educational Attainment of Respondents

Most of the respondents are unemployed (60%) as most of the respondents are the wife of the household heads (). Meanwhile, the remaining 41% who are currently employed are generally involved with farming activities (**Figure 3-10**), followed by employment as government staff or officials (27%) and owning a business (10%). The rest of the respondents have are working as drivers of public utility vehicles (PUVs), construction workers, and staff in the private sector and in service sector such as laundry and ironing services. Most of the employed respondents are working within the barangay (86%) while only 14% are working outside the barangay (**Figure 3-11**).

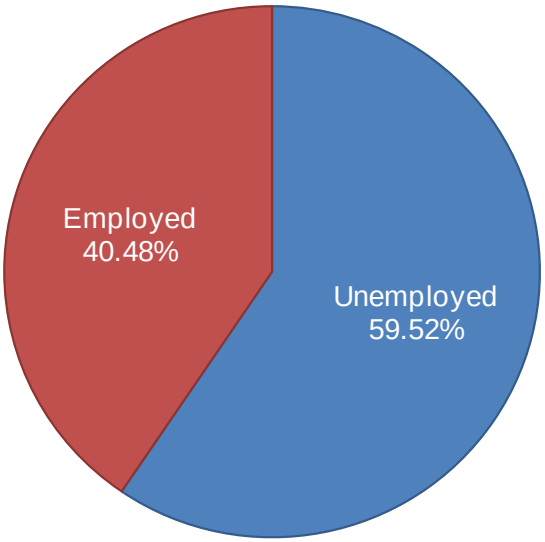

Figure 3-9
Employment Status of Respondents

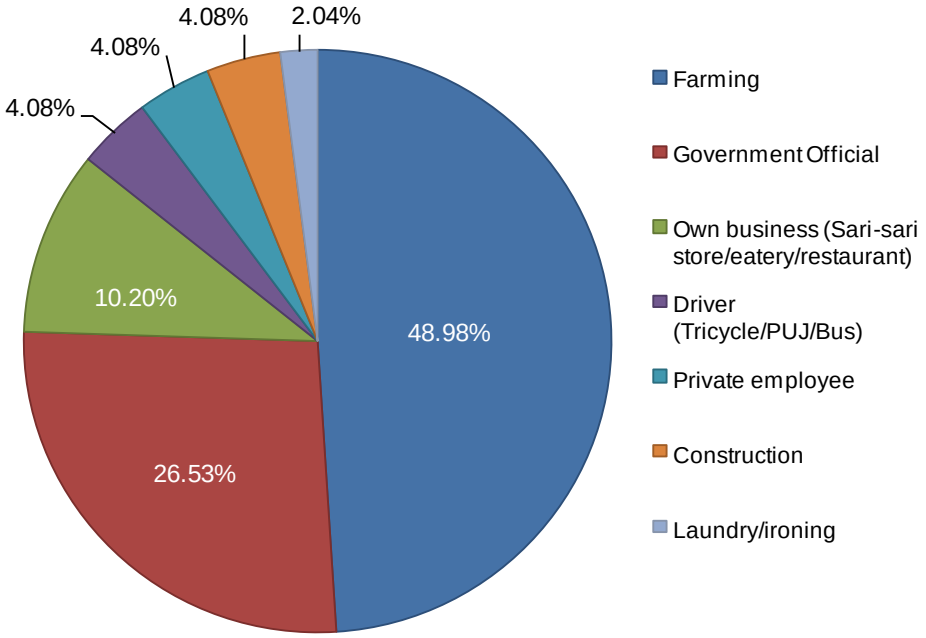

Figure 3-10
Nature of Work of Respondents

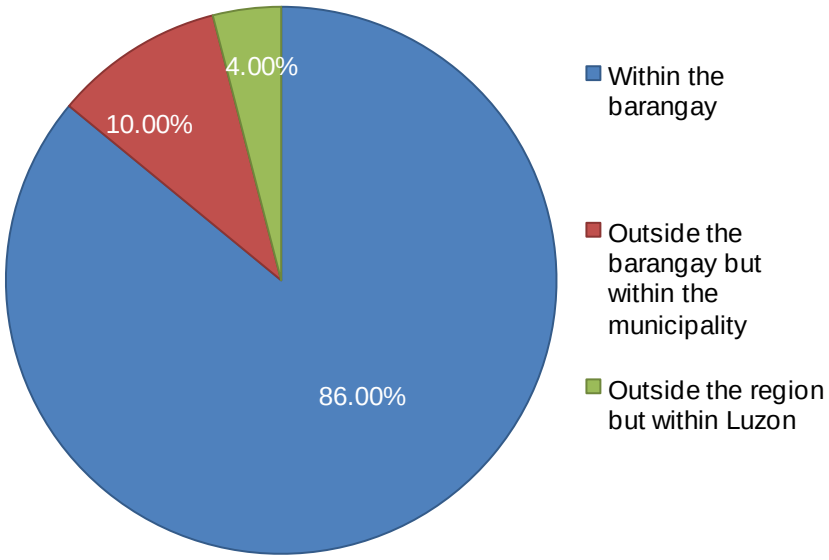

Figure 3-11
Location of employment

In line with this, **Figure 3-11** lists that 52% of the interviewees receive amounts between P1,000.00 to P4,999.00, and 28% earn amounts between P5,000.00 to P9,999.00. Respondents that garner earnings less than P1,000.00 per month amount to 10%, while 4% of the residents have a monthly income within the ranges of either P10,000.00 to P14,999.00 or above P20,000.00.

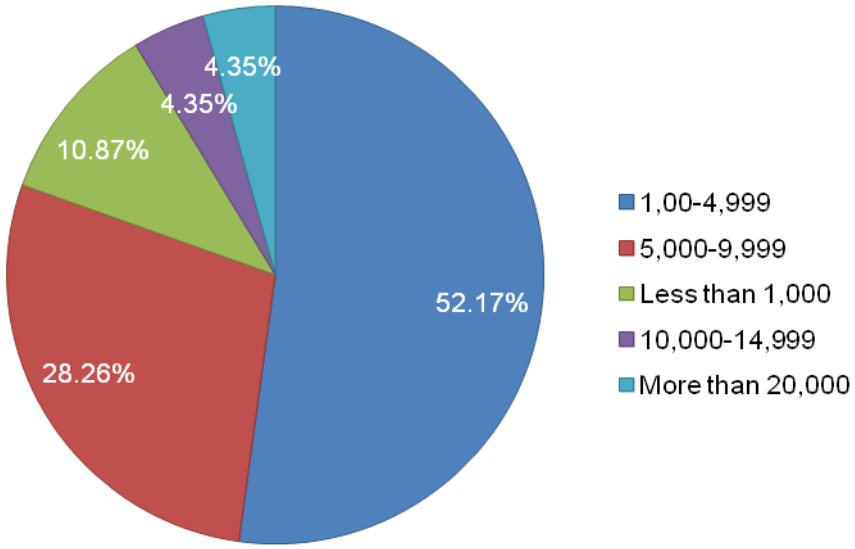

Figure 3-11
Income of Respondents

3.2.2 Household Profile of Respondents

Based on the survey in **Figure 3-12**, fathers are chiefly the heads of the household and 19% of the respondents regard mothers as the heads of their respective households. Meanwhile, the listed alternatives are other male relatives (5%), other female relatives (3%), or daughters (2%). The least to be recognized as household heads may be the son (1%), or other options (1%).

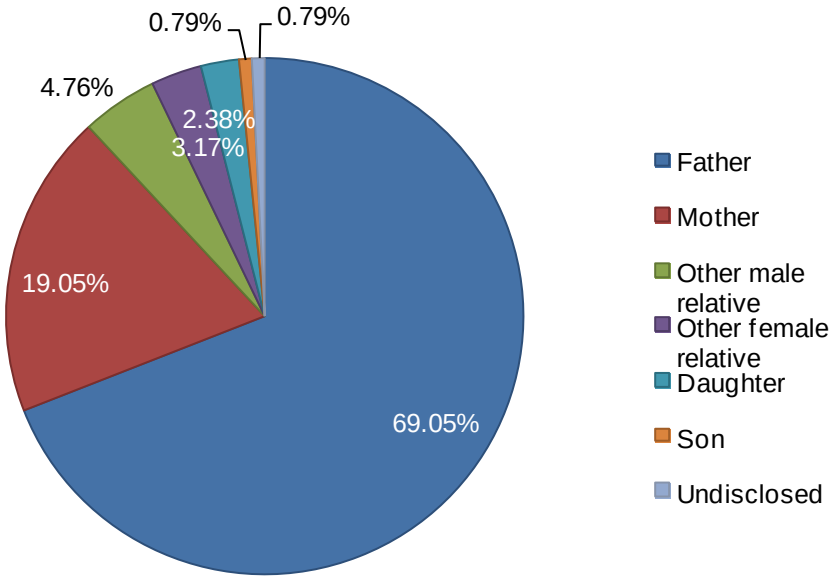

Figure 3-12
Head of Household of Respondents

According to the findings in the survey in **Figure 3-13,** 43% of the respondents belong to households with 5 to 6 members, while 32% belong to households with 3 to 4 members. Others (11%) have a household size of 7 to 8, while 8% have a size of 1 to 2. The rest of the respondents are members of households sized in between 9 to 10 (4%), or over to (2%). Lastly, 1% of the interviewees gave no response

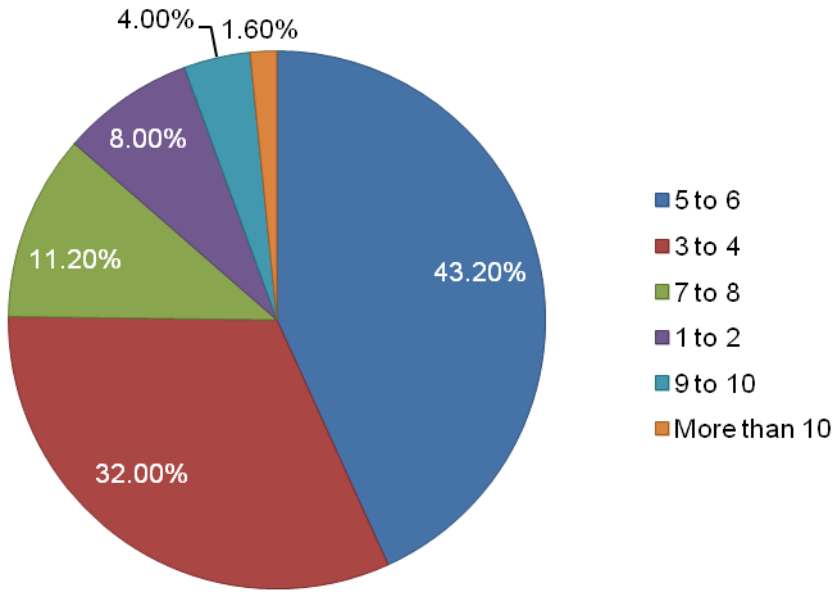

Figure 3-13
Household Size of the Respondents

Majority of the sample size own land (seen in **Figure 3-14**)**,** while the rest are tenants (10%), caretakers (6%) or are renting the land they are occupying (1%). Alternately, other relatives of the respondents own the land (40%), followed by their parents (25%), aunts/uncles (15%), brother-in-law (10%), sister (5%), and brother (5%).

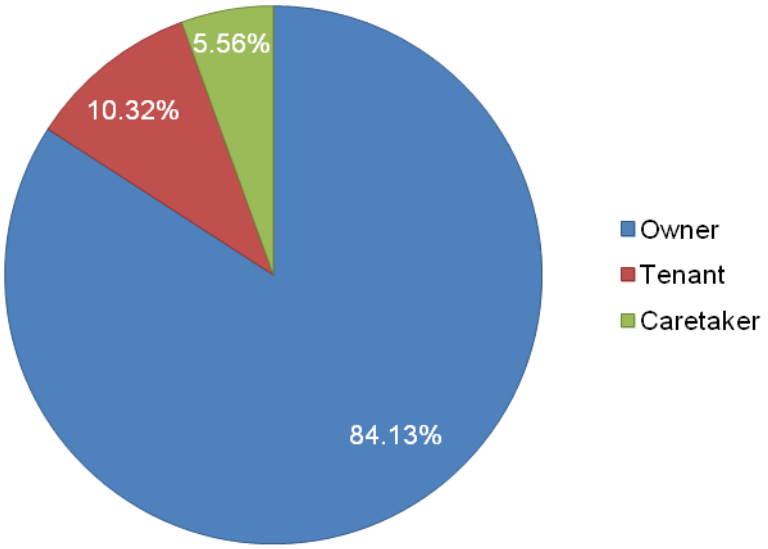

Figure 3-14
Land Ownership of Respondents

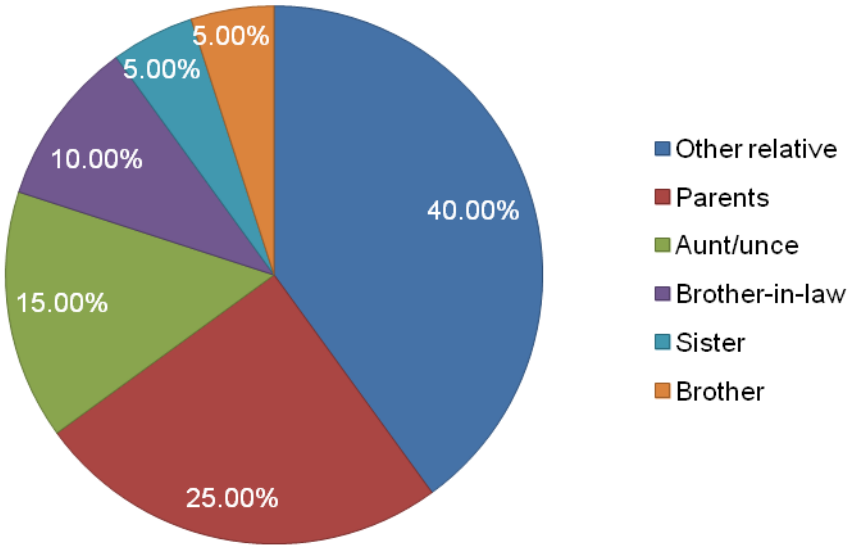

Figure 3-15
Land Owner of Respondents

With relation to this, **Figure 3-16** shows that presents that while majority of the respondents are owners of the structures they occupy, 8% are tenants, and 4% are renting. Meanwhile, 2% of the respondents did not give any response.

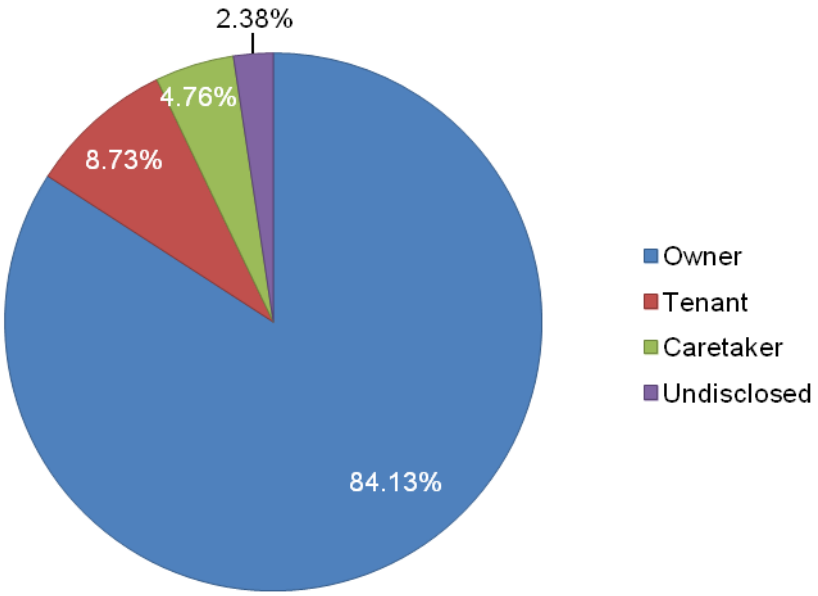

Figure 3-16
Structure Ownership of Respondents

From **Figure 3-17**, 26% of owners are aunts/uncles of the respondents, 26% are parents, 26% are other relatives, followed by their brothers-in-law with 10%, sister with 5%, and brother with 5%.

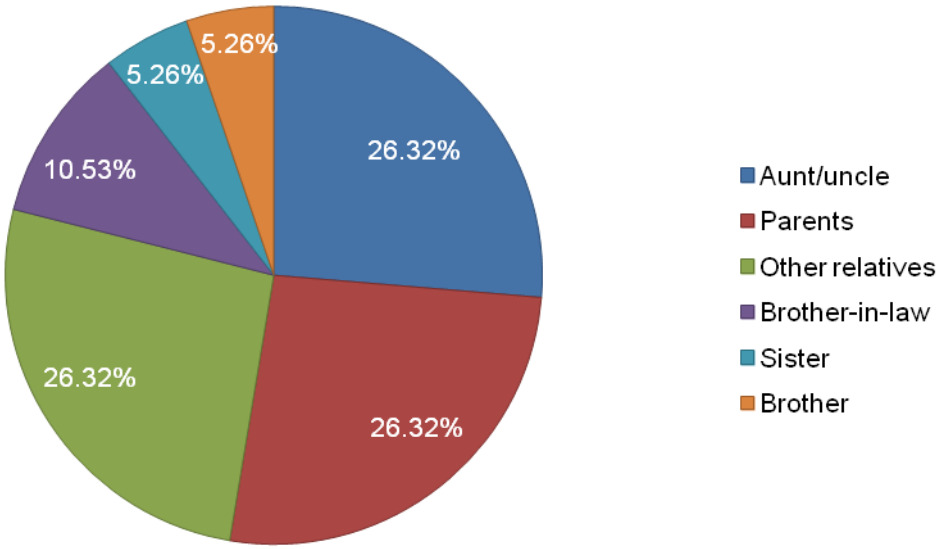

Figure 3-17
Structure Owner of Respondents

Most of the respondents (78%) are using water-sealed toilets, while **Figure 3-18** presents that 18.% have flushed toilets and 2% use pit latrines. On the other hand, 1.59% did not give any response.

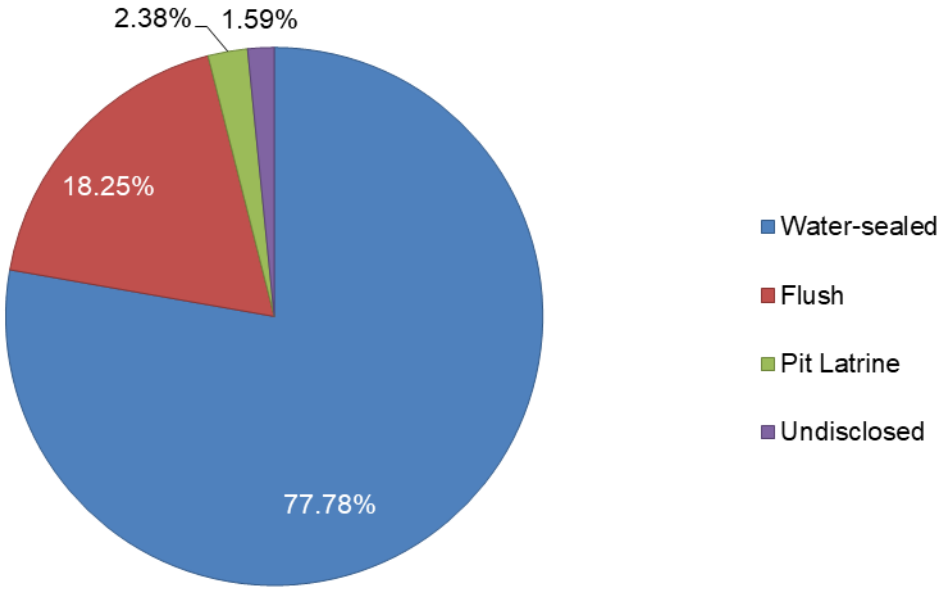

Figure 3-18
Type of Toilet Facility of Respondents

In **Figure 3-19,** respondents mainly contract cough (38%) or fever (20%). Occasionally, they experience high blood (18%), arthritis (3%), asthma (2%) or colds (8%). Other illnesses (each at 1%) that respondents state their household experience are the following: headaches or migraine, heart disease, eye problems, flu, tonsillitis, Alzheimer's, Diabetes, dengue, boils, infection, sciatica, rheumatism and intestinal problems. Meanwhile, 5% of the respondents did not give any response.

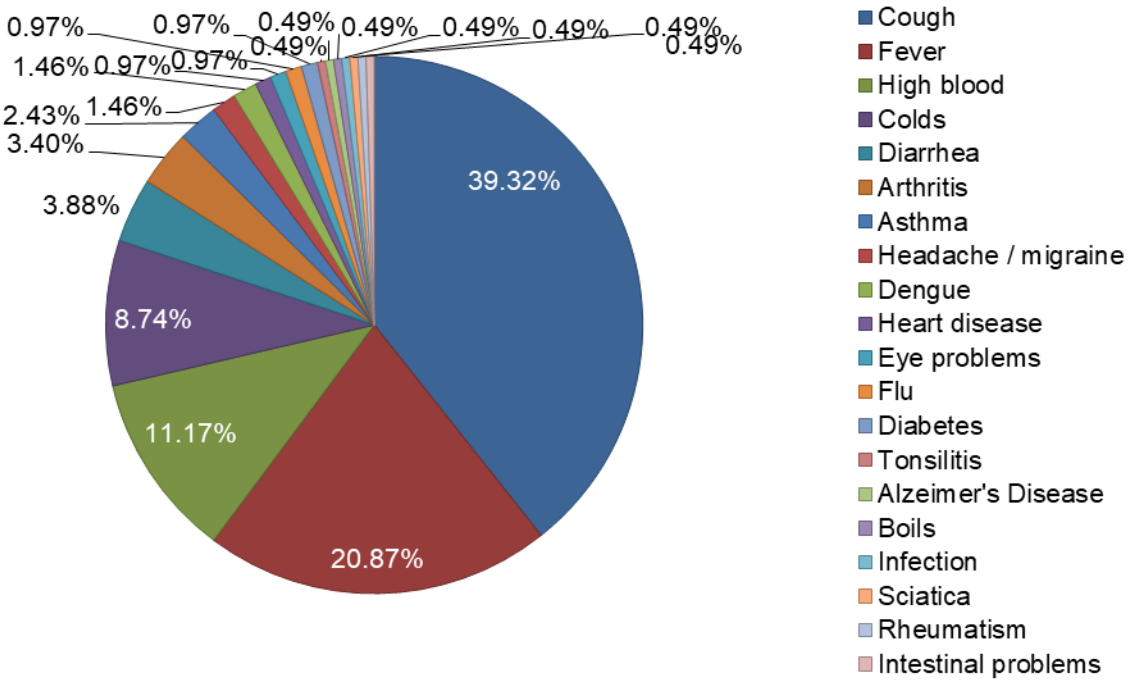

Figure 3-19
Common Illnesses in Households of Respondents

Most of the respondents (as shown in **Figure 3-20**), subscribe to water sources available in the community for public consumption. Fewer get water from hand pumps, shallow wells or rainwater (5%), or opt to access water through private suppliers (2%). Around 1% did not give any response, while 4% claimed that they secure mineral water for consumption and use.

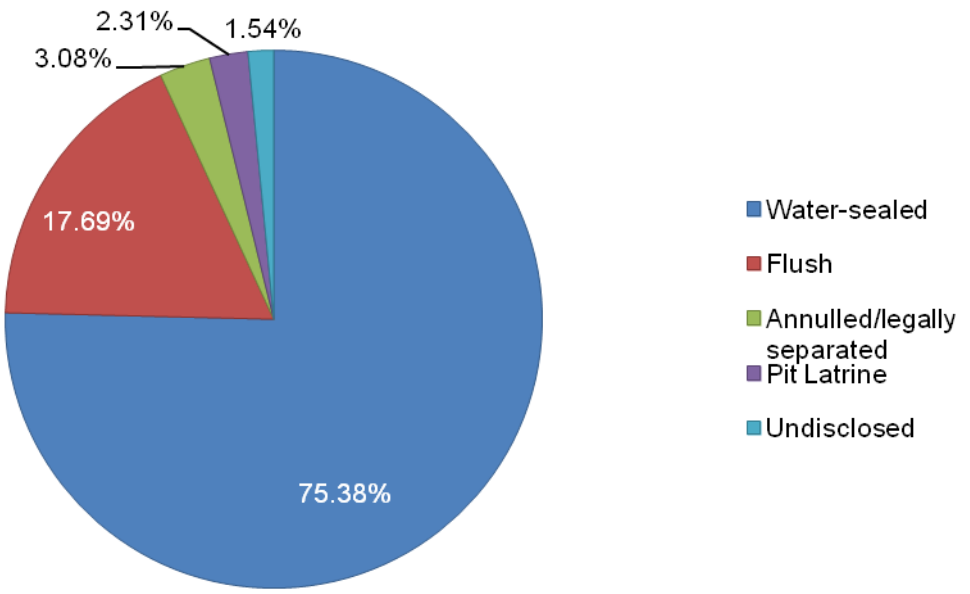

Figure 3-20
Source of Domestic Water Supply of Respondents

3.2.3 Perception of the Respondents on the Project

This section asks the respondents for their perceptions on the project were and what measures can be conducted to address their concerns and improve certain aspects of the project. Among the interviewees, 70% are familiar with the NIA while 30% are not as observed in **Figure 3-21**.

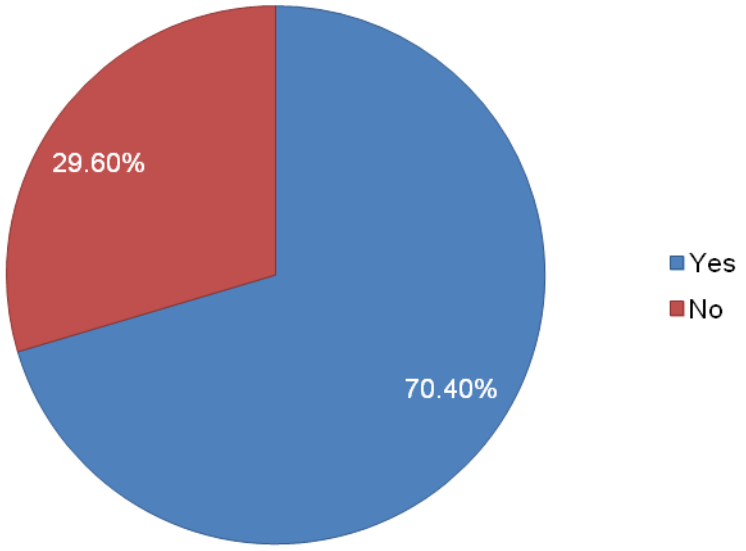

Figure 3-21
Awareness of the Project by the Respondents

However, only 65% are aware that NIA is the National Government Agency responsible for providing irrigation water to farmers as seen in **Figure 3-22**.

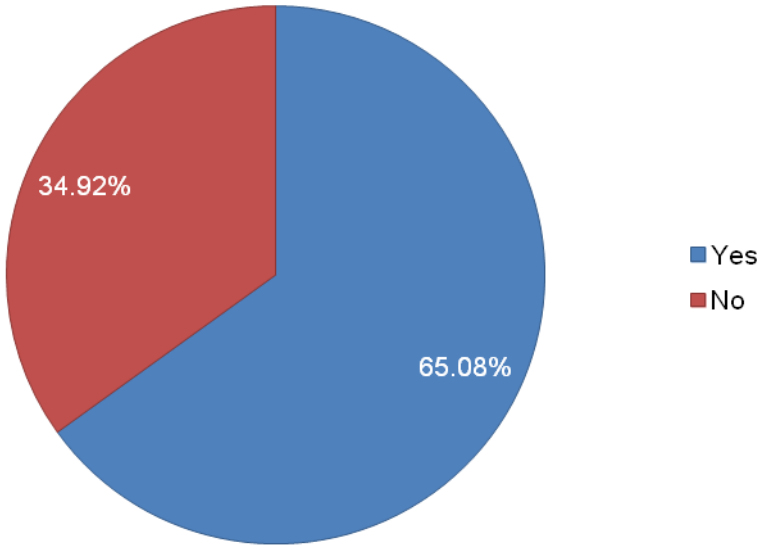

Figure 3-22
Awareness of NIA Responsibility by the Respondents

When asked if the respondents have heard of the Ilocos Sur Irrigation Project being implemented in their barangay, 67% are aware of this implementation while the remaining 33% were not as shown in **Figure 3-23**.

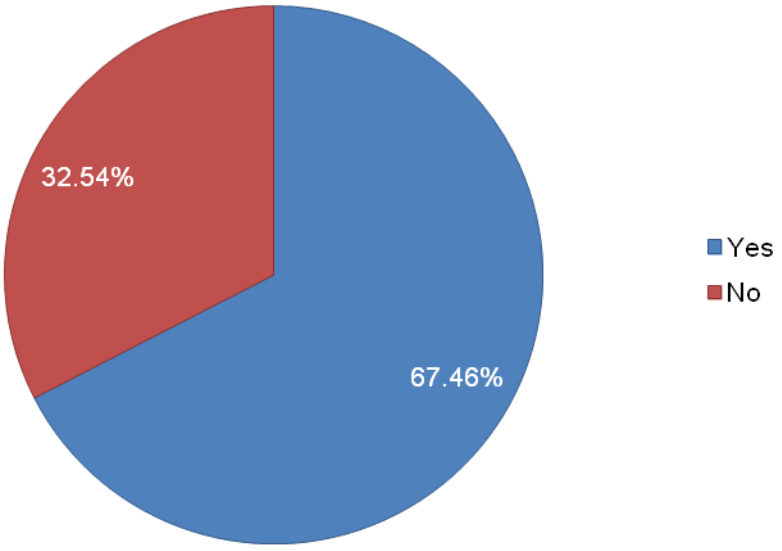

Figure 3-23
Awareness of ISIP by Respondents

According to the respondents aware of the Project as seen in **Figure 3-24**, they heard about the project from news from friends/relatives/neighbors (24%), government/barangay officials (23%), barangay meetings and public consultations (20%), officials from NIA (17%), surveys, studies, and research (8%), and previous IECs (3%). The previous IECs were, however, conducted in the form of Public Consultations.

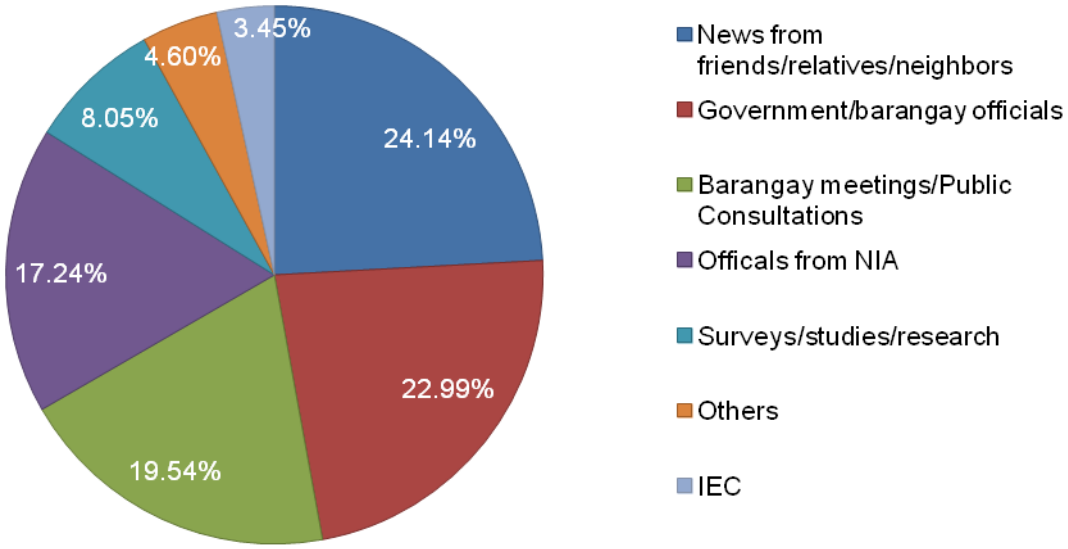

Figure 3-24
Ways the Respondents Heard of the Project

The respondents were asked both positive and negative impacts of the project to various aspects such as the people, the environment, and the economy. The highest number of positive impacts garnered was the availability of more water supplies for famers with 65% as observed in **Figure 3-25**. This is followed by larger income with 18%, better crops and more sales with 10%, increase in number of farmers with (3%), increase in number of farmers with 2%, easier work for the farmers at 2%, and better environment also at 2%.

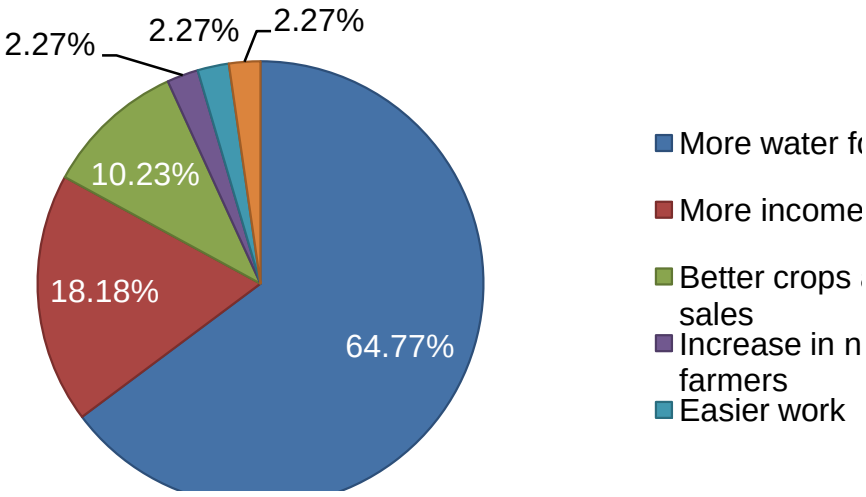

Figure 3-25
Positive Impacts of the Project as Perceived by Respondents

As for negative impacts, **Figure 3-26** shows that the respondents mostly fear that accidents might occur (30%) during the construction and operation of the project and that

hazards, like flooding and erosion (30%), may happen and even worsen. Others worry that the environment might deteriorate (16%), they might lose their livelihood (14%), and they might lose their income (10%).

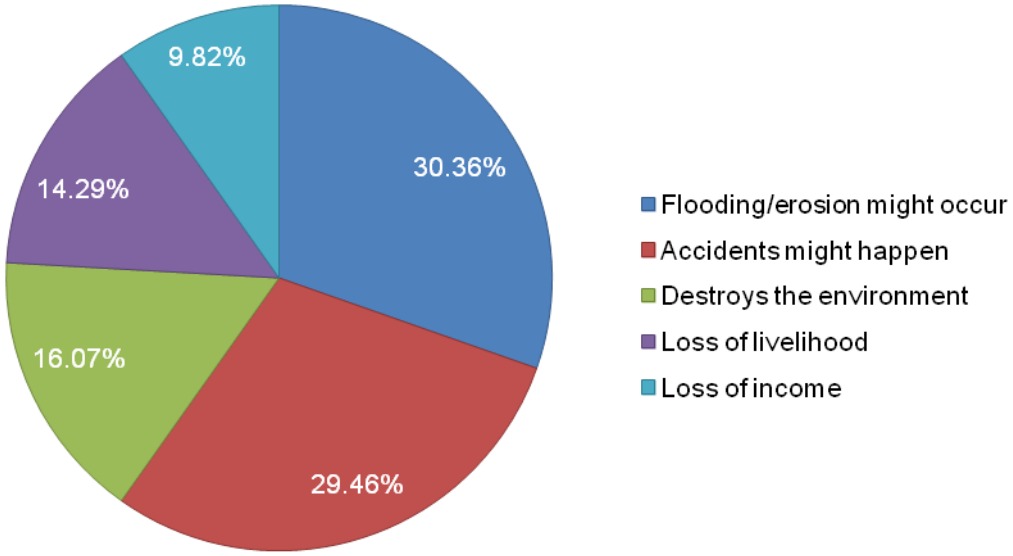

Figure 3-26
Negative Impacts of the Project as Perceived by Respondents

However, they were also asked the possible ways these negative impacts may be mitigated or compensated. There were strong requests for providing water supply in their area (26%, as seen in **Figure 3-27**) so they could be beneficiaries of the Project as well. Some suggested to add flood control infrastructures and measures (13%), discontinue the project (13%), provide further studies, proper design, and sturdy infrastructure (11%), generate job opportunities (9%), improve and/or continue the existing irrigation system (8%), include hydropower (8%), replace the tunnels with irrigation canals instead in the design (6%) and provide proper compensation to the project-affected residents (5%). Others answered for more public consultations for further explanation, relocate the affected families, and avoid laying the design on the existing farmlands.

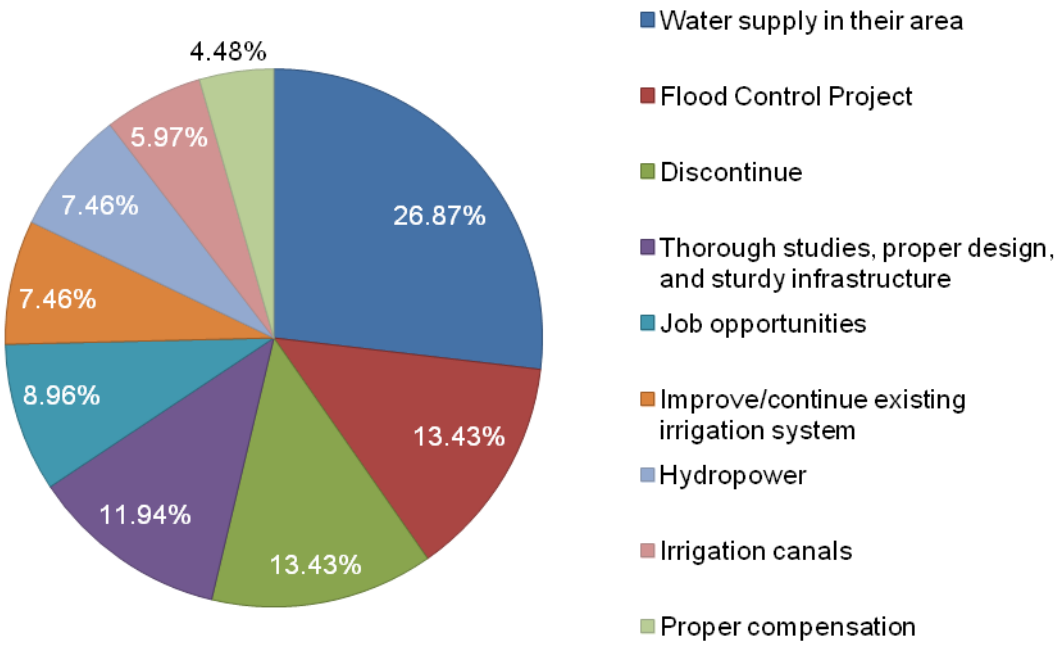

Figure 3-27
Ways to Address Negative Impacts of the Project as Perceived by Respondents

3.2.4 Acceptability of the Project by the Respondents

After asking for their perception, the respondents were asked if they were in favor of the implementation of ISIP. In line with **Figure 3-28**, a little over half of the interviewees said they agree with its implementation with 58%, others disagreed with 38%, while the remaining 4% were unsure whether they agree or disagree with it.

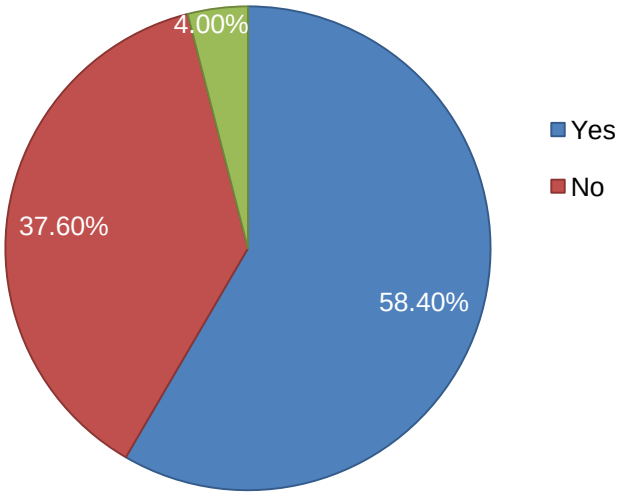

Figure 3-28
Acceptance of the Project

For those who agree to implement the project, 70% as listed in **Figure 3-29** said they were convinced of its necessity to provide accessible water supply to the farmers. Some 12% saw its potential benefits to farmers and the community, 4% are in favor because of the availability of water during summer, 4% for economic development, 2% for the possible hydropower and electricity supply, 2% for employment opportunities, 2% so they would not need to depend on rain anymore for water supply, and 1% agreed to it as long as there would be no damage during its implementation.

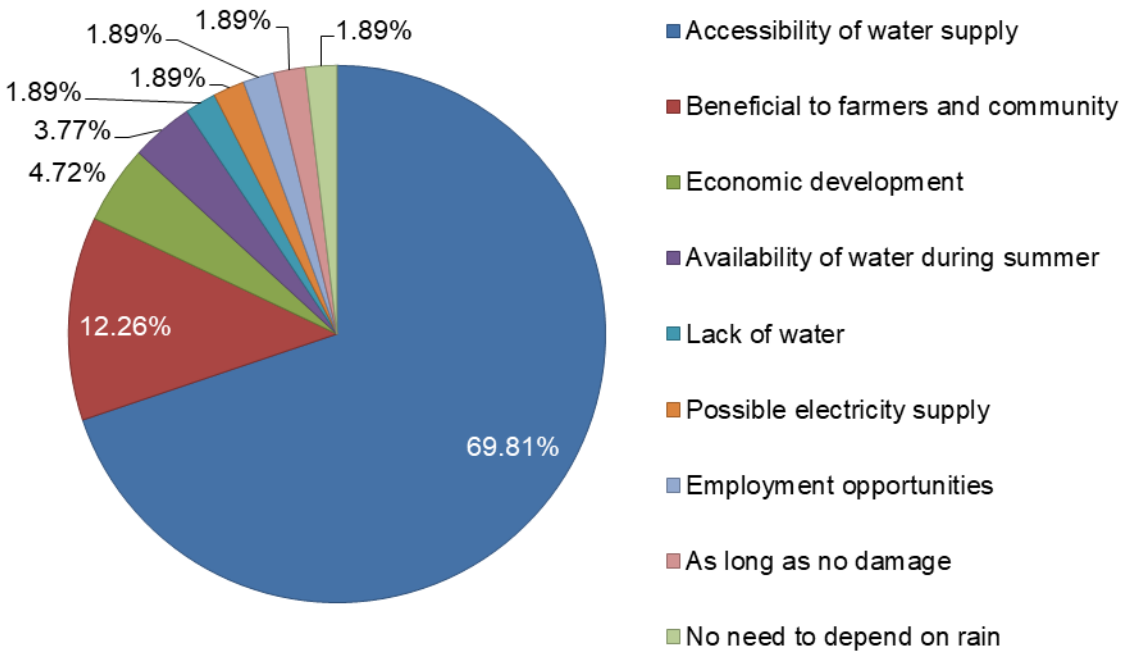

Figure 3-29
Reasons Respondents Agree to the Project Implementation

On the other hand, the respondents who disagreed to the project expressed their reasons why they are opposed as listed in **Figure 3-30**. About 57% said the fear the occurrence of flooding, 27% said the project might destroy the environment, 6% said there might be negative impacts to the livelihood and people, 3% said their crops might be destroyed, 3% said there might be possible damages to properties, 3% feared the possibility of landslides, and 1% were worried that there will be no compensation if they are relocated and/or flooded. Some 1% said they agree to the project as long as no damage occurs

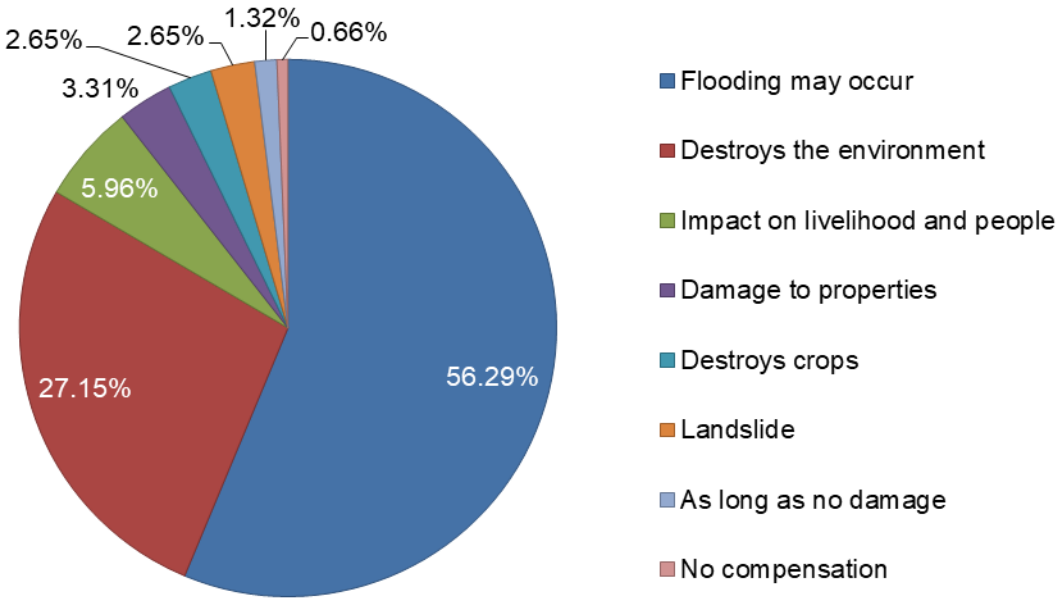

Figure 3-30
Reasons Respondents Disagree to the Project Implementation

To further improve the project, the interviewees were asked for their suggestions and recommendations that could be included listed in **Figure 3-31**. Some 48% said they seek water supply in their area, 23% want the construction of a bridge, 5% wanted to discontinue the project, 4% suggested the need for comprehensive studies, appropriate designs, and strong construction of the project, 3% said they want an access road, 3% said to continue and enhance the existing projects, 3% to provide livelihood opportunities, 3% wanted electricity from hydropower, 2% wanted proper compensation, 2% suggest a flood control project, 2% wanted irrigation canals instead of tunnels, 1% wanted relocation of affected families, and 1% requested to include their barangay as a beneficiary.

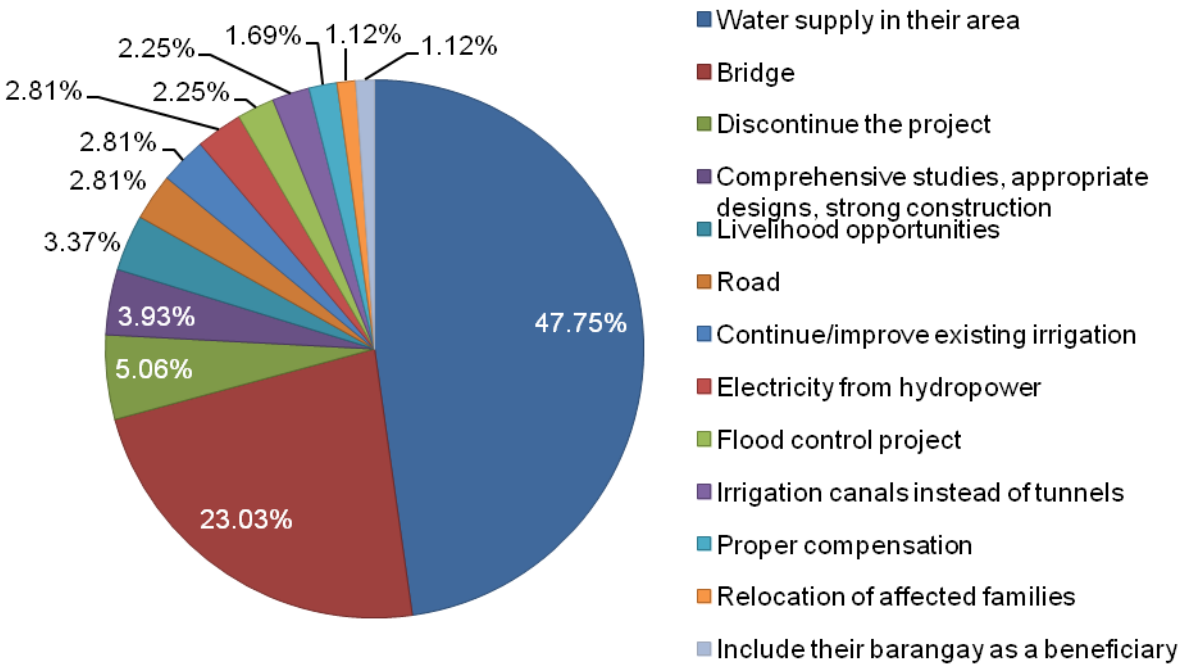

Figure 3-31
Suggestions and Recommendations by the Respondents

After the interview, 70% of the respondents deem that their recommendations were being addressed and heard, 17% are unsure, while only 13% said no as viewed in **Figure 3-32**.

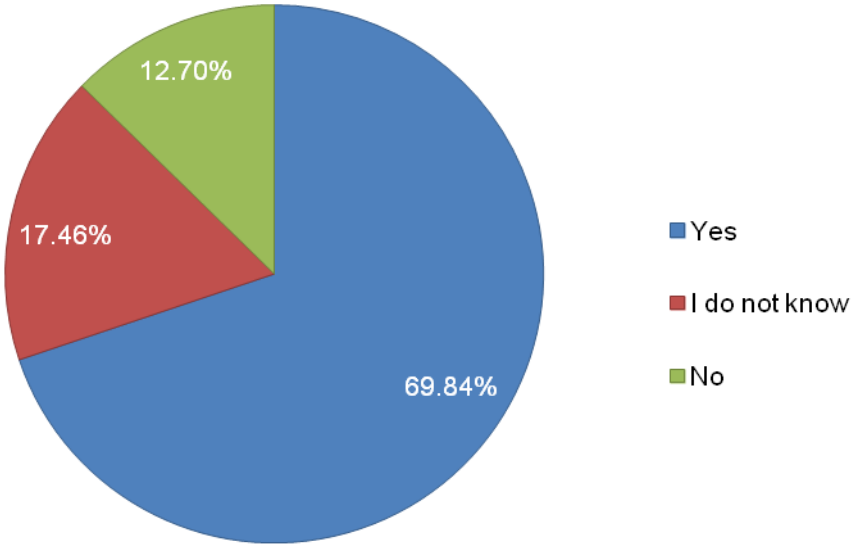

Figure 3-32
Perception on Addressing Recommendations

3.2.5 Perception on and Acceptability of the Project by Members of Indigenous Peoples Groups

The Province of Ilocos Sur is identified to be rich in culture and houses diverse Indigenous People's Groups. Hence, several questions were asked for those belonging to IP Groups. About 63% said they currently belong to one while 37% said they were not a member of any group as seen in **Figure 3-33**.

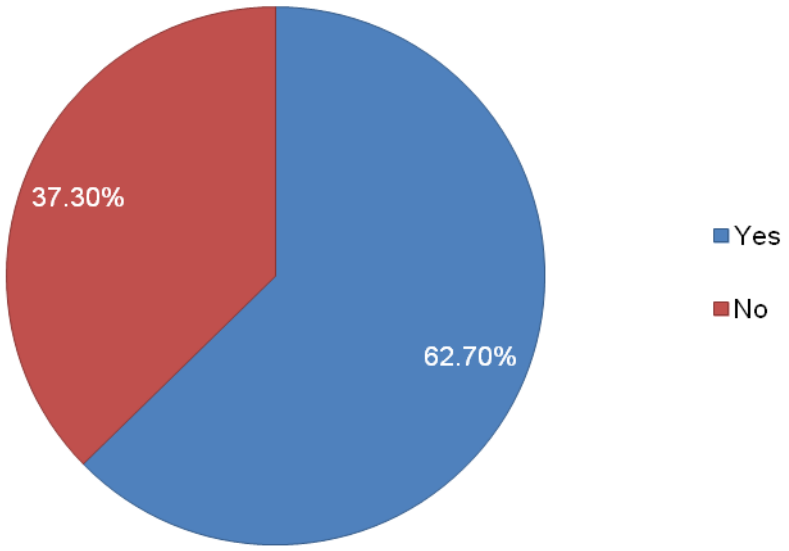

Figure 3-33
Membership in IP Groups

Most of the respondents belong to the Bag-o group (63%) while the rest belong to Ilocano (18%), Kankana-ey/Itneg (7%), Tingguian group (6%), Igorot (4%), Manobo (1%), and tribal women (1%) as shown in **Figure 3-34**.

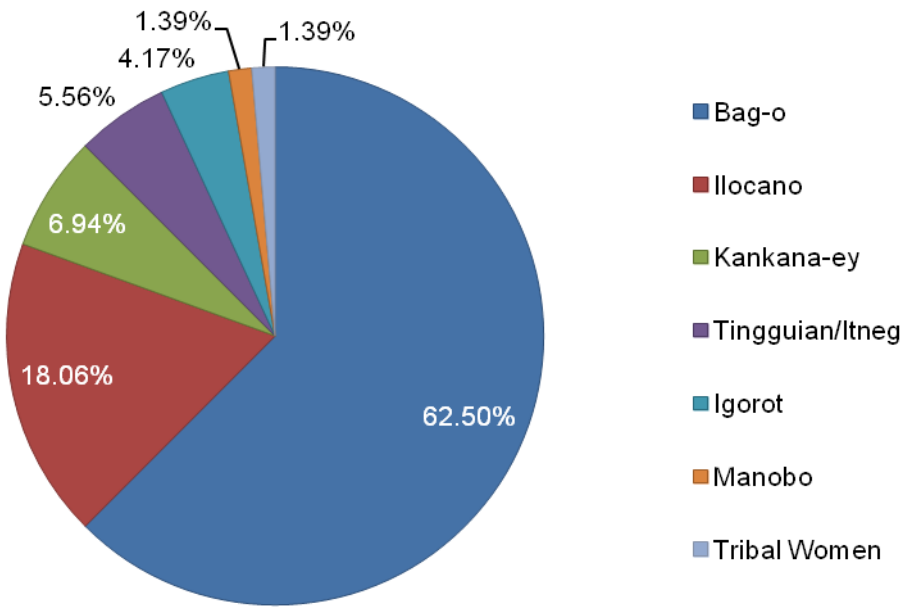

Figure 3-34
IP Groups

The IP Group members were then asked how the project could help their tribal group. In line with **Figure 3-35**Figure 3-36, about 18% said the project can help them with the accessible water supply, 18% said for livelihood opportunities, 16% stated that it is beneficial to farmers, 13% saw the benefits of the generation of electricity from hydropower, 10% see its advantages for irrigation purposes for crops, 10% it could be helpful if irrigation canals could replace tunnels in the design, 8% said the project could help their tribe if there was proper compensation, and 5% saw it could benefit those who can be relocated.

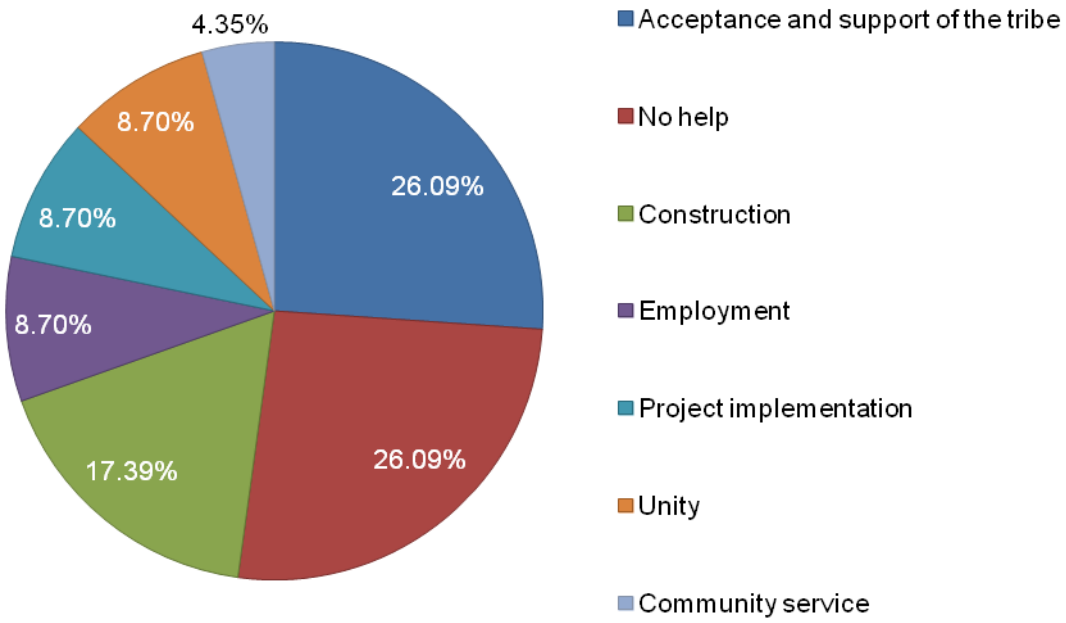

Figure 3-35
Ways the Project Helps IP Groups

Moreover, they were then asked how their group could contribute to the project listed in **Figure 3-36.** Some 26% said their tribe could contribute to the project if they accept and support it as a tribe, 26% said they cannot help, 17% said they could offer their services during construction, 8% stated through employment, 8% mentioned they could contribute during project implementation, 8% through unity, and 4% with community service.

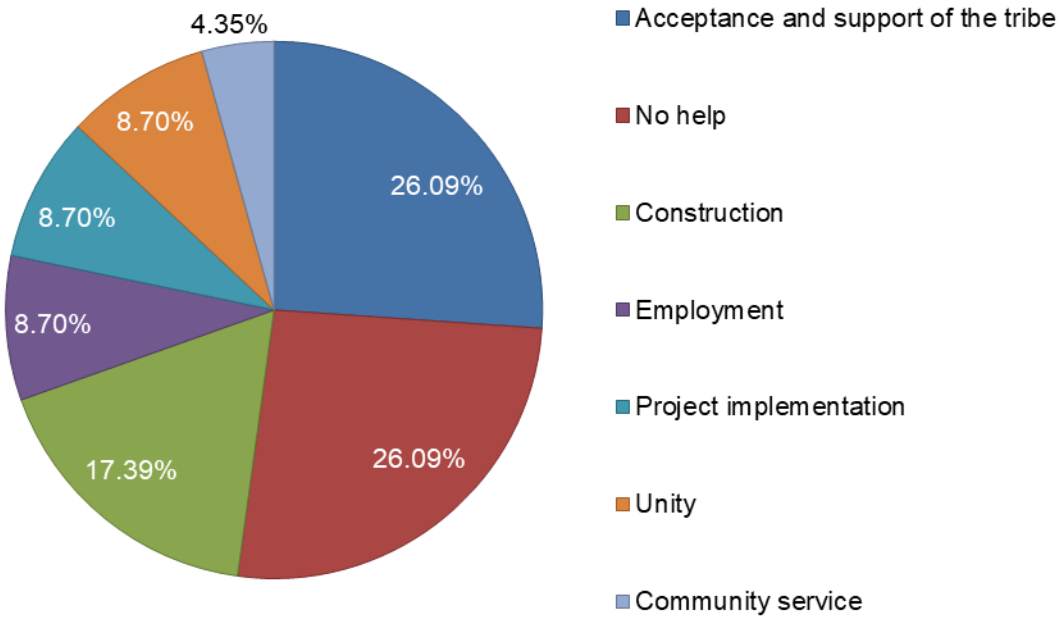

Figure 3-36
Ways IP Groups Help in the Project

They were also asked their perception if they think there could be any possible hindrance in the implementation of the project. Observed in **Figure 3-37**, about 64% were unsure, 24% said yes, while 12% said no.

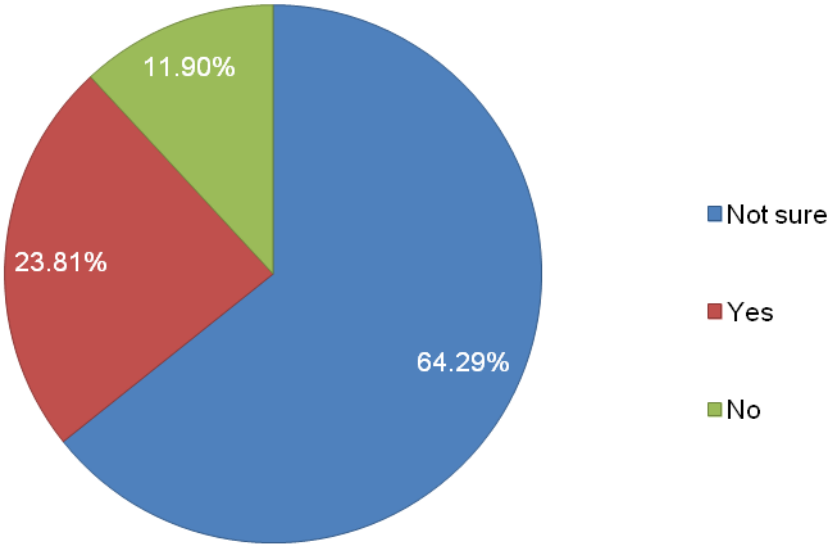

Figure 3-37
Possible IP Group Hindrance

Lastly, they were asked their perception on how to resolve the possible hindrances. In line with **Figure 3-38**, about 35% said thorough explanation with another public consultation may be able to resolve this; followed by disagreement (15%), provision of electricity (15%), replacing tunnels with irrigation canals (12%), proper compensation (9%), relocation of affected families (6%), including their barangay as a beneficiary (6%), and discussion of advantages (3%).

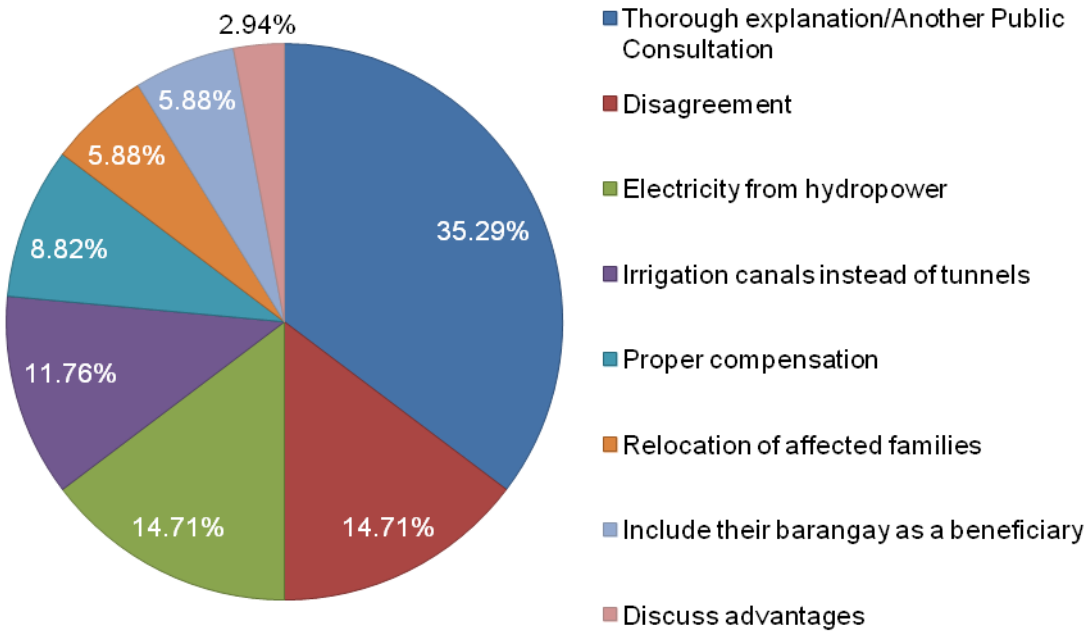

Figure 3-38
Ways to Resolve Hindrance

3.3 Preparation for Public Scoping

In preparation for the public scoping, initial stakeholder identification was done to include people from different groups and sectors at different government levels. The summary of the initial list of stakeholders is presented in

Table 3.3-1 while the detailed list and information of the respective stakeholders is presented in **Annex 5**.

The identified stakeholders will be notified and invited for the said public scoping on a date, venue and time agreed upon between the DENR-EMB CO, the proponent and the invitees using the draft letter presented in **Annex 6**.

Finally, a copy of the presentation to be used on the public scoping is presented in **Annex 7**.