Initial Environmental Examination

Project Number: 41461-013
November 2014

Viet Nam: Sustainable Rural Infrastructure Development Project in the Northern Mountain Provinces

Subproject 52: Improving Domestic Water Supply in Pa Tan Commune, Sin Ho District, Lai Chau Province

Prepared by Ministry of Agriculture and Rural Development for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of October3rd, 2014)

Currency Unit	-	Vietnamese Dong (VND)
USD 1.00	=	VND 21,250

ABBREVIATIONS

ADB	-	Asian Development Bank
AP	-	Affected persons
CPMU	-	Central Project Management Unit
CSC	-	Construction Supervision Consultant
DARD	-	Department of Agriculture and Rural Development
DCARB	-	District Compensation, Assistance and Resettlement Board
DIA	-	Direct Impact Area
EARF	-	Environmental Assessment and Review Framework
EIAR	-	Environmental Impact Assessment Report
EPU	-	Environmental Protection Undertaking
EMP	-	Environmental Management Plan
ESA	-	Environmental Study Area
IEE	-	Initial Environmental Examination
IOL	-	Inventory of Loss
IIA	-	Indirect Impact Area
LIC	-	Loan Implementation Consultant
MARD	-	Ministry of Agriculture and Rural Development
MONRE	-	Ministry of Natural Resources and Environment
PC	-	Peoples Committee
PPMU	-	Provincial Project Management Unit
REMDP	-	Resettlement and Ethnic Minority Development Plan
RF	-	Resettlement Framework
SIA	-	Secondary Impact Area
UXO	-	Unexploded Ordinance
WTP	-	Water Treatment Plant

This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the “terms of use” section of this website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

TABLE OF CONTENTS

Page

TABLES AND FIGURES

I. INTRODUCTION

1. The Sustainable Rural Infrastructure Development Project in Northern Mountain Provinces is funded by the Asian Development Bank (ADB) for 15 NorthernMountain Provinces which includes: Ha Giang, Cao Bang, Bac Kan, Tuyen Quang, Lao Cai, Yen Bai, Thai Nguyen, Lang Son, Bac Giang, Phu Tho, Dien Bien, Lai Chau, Son La, Hoa Binh and Vinh Phuc. Total Project investment is $138 million. The project began in February 2011 and is expected to end in June 2017. Recently, savings have been realized from the procurement of civil works of the first 41 subprojects, which ADB agreed for use in funding the implementation of additional Water supply subprojects.

2. The Ministry of Agriculture and Rural Development (MARD) is the executing agency for the sector loan. The Project is to meet two main objectives as follows:

- Upgrade the rural infrastructure works that includes:
  - (i) Rural roads and rural markets;
  - (ii) Rehabilitation of irrigation works, clean water supply and streambank rivetment; and
  - (iii) Support measures that help the poor to benefit equally with other sectors and efficient optimization of the sub-project benefits.
- Improve the project management capacity in the building, management and exploitation of sustainable rural infrastructure.

3. As part of the Sustainable Rural Infrastructure Development Project in the Northern Mountain Provinces, the “Improvement of domestic water supply in Pa Tan commune, Sin Ho district.”subproject will be built in Pa Tan commune, inSin Ho District, inLai Chau province.

4. **Sub-project objectives.**The sub-project aims to supply potablewater thatmeets the Vietnamese health standards (QCVN 01: BYT/2009) for the people in Pa TanCommune, in Sin Ho Dictrict,Lai Chau Province.

5. This Initial Environmental Examination (IEE) has been prepared to satisfy the environmental safeguards requirements of both ADB and GOV.

6. **The IEE for the subproject withCategory B classification contains the following information:**

(i) Section II: Description of the subproject
(ii) Section III: Description of the existing environment
(iii) Section IV: Environmental impact screening
(iv) Section V: Outline environmental management plan
(v) Section VI: Public consultation and disclosure activities
(vi) Section VII: Grievance Redress Mechanism
(vii) Section VII: Conclusion and Recommendations

II. PROJECT DESCRIPTION

Table 1. General Information on the Subproject

Description	Subproject data
1. General information	
1.1 Subproject Name	Improvement of domestic water supply in Pa Tan commune, Sin Ho district.
1.2 Subproject Type	Clean water supply
1.3 ADB Environment Category	Category B
1.4 Project Owner	Lai Chau Deparment of Argriculture and Rual Development (DARD),Lai Chau PPMU of the Sustainable Rural Infrastructure Development Project in the Northern Mountain Provinces
1.5 Address of Project Management Unit	Lai Chau Town, Lai Chau Province
1.6 Name and title of the head of the PMU	Dao Ngoc Huong, Director of Lai Chau DARD
1.7Telephone, fax and email details of the PPMU	Tel: 0321. 3876 582 Fax: 0231.3876712 Email: Sonnlaichau@yahoo.com
1.8 Name of Environmental Officer of the PPMU	Vu Van Hung
1.9 Telephone, fax and email details of the PPMU's Environmental Officer	Tel: 0982.259.228 Email: vuvanhungsnnlaichau@gmail.com
2. Subproject description	
2.1 New project or rehabilitation project	New project
2.2 Objective of the project/subproject	SP seeks toimprove the health and quality of life for 3,400 persons in ten hamlets of Pa Tan commune, including institutional and residential areas through providing sanitation and clean water with the capacity of 100l/day/person.
2.3 General Description of Subproject works.	• **Work Item 1**: Water supply system forthe six hamlets ofAn Tần, Pa Tần 3, Pa Tần 2, Pa Tần 1, Cầu Phà and Pa Tần 4, with capacity of 513,49 m^3/day o Construction of intake structure consisting of:weir, filter box, raw water transmission pipeline; o Construction of secondary filtertankand storage tank. o Installation of distribution pipeline for clean water to residential households. • **Work Item 2**: Water supply system for Pho 2 hamlet with capacity of 24 m^3/day including intake structure, secondary filtertank, storage tank and raw water and distribution pipeline system; • **Work Item 3**: repairand upgrading of existing water supply station for Pho 1 hamlet with capacity of 27 m^3/day including the installation of a new primary and secondary filter tanks, and storage tank.
2.3. Design capacity (m^3/day)	• Existing: 150m^3/day • Proposed works: as mentioned above, the total capacity of two sources is 614 m^3/day
2.4. Water intake structure	• Three newraw water intake strutures will be constructedon Nam Sao and Nam Tien springs. These will be provided with new primary filter box each.
2.5 Treatment Facility	**Existing**: None **Proposed:** • Work Item #1 - Construction of a new secondary filter tank

Description	Subproject data
	Source 2: • Work Item #2: construction ofa new storage tank • Work Item #3 : construction of a new storage tank • The above treatment methods were used in the WS design in view of the laboratory test results of samples taken from the raw water sources. The water quality analysis are compliant to the limited MOH standards except for only one criteria of E.Coli exeeding than the standards. The proposed treatment methods is expected to remove the contaminants to within the MOH drinking water standards. However, no chlorination which will sanitize the raw water from pathogenic bacteria that may be present Details of the raw water quality test analysis is found in Appendix IV. Technical design consultant have been requested to implement a type of chlorination into the design of WS
2.6Pipeline	• The rawpipeline alignmentsconveyingraw waterfrom the springsto thetankswill be installed (mostly buried 0.5-0.8 m deep)crossing the provincial roadat the side/embankment of the road within the ROW. • The mainwater pipeline that will convey filteredwater towards the service area, along the main roads, will also be installed (mostly buried 0.5-0.8 m deep) at the side/embankment (of the road) within the ROW. • The secondary/distribution pipeline conveying filtered/treated water from the main pipeline to the residences will have an alignment as much as practicable, avoiding private properties in the same manner as the main pipelines. These pipelines is made of HDPE/steel has a total length of 10,000m.These pipes will be mostly buried at a depth of 0.8-1.0m.
3. Construction activities	
3.1 Commencement date (month/year)	May/2015
3.2 Completion date (month/year)	May/2016
3.3 Number of workers	The number of workers varies from 30to 60 depending on the phase of construction.
3.4 Construction camps required (Yes/No)	Yes, a worker camp shall be built with the area of 500 m^2 including material storage yard and work office.
3.5 Construction in rainy season (Yes/No)	Intake worksand pipelines can not be constructed in rainy days. On the other hand, the tanks and it's auxiliary facilities can be installed even during mild rain.
3.6Location and extent of material sources to the subproject areas	Stone, sand, construction steel, iron and cement will be supplied from government licensed suppliers from the Lai Chau townwhich is 30 km away from the construction sites. The temporary storage yards of materials will be establishedat the yard of the worker's camp or in tank site during the construction phase.
3.7Methods on management/ handling of excavated soil/surplus soil (if any)	• The excavated soil is very small (500-600m^3) and shall be reused as filling material. No surplus soil is expected to be generated by construction activities.
3.8Number and condition of vehicles and equipment	The main construction equipment includes: 6trucks(10T capacity),1 bulldozer, 5 compactors, 4 concrete mixers, and 1 portable electric power generator (50KVA) and other equipment
b. Distribution and service pipeline	
3.9Number of workers	a. Management board / Technical officer: 5 persons b. Skilled workers: 20 persons c. Non skilled workers: 35 persons
3.10Construction camps required (Yes/No)	Yes

Description	Subproject data
3.11Construction in rainy season (Yes/No)	Yes, but onlyin mild rain
3.15 Location and extent of material sources to the subproject construction site	For the pipeline, storage area of pipes and excavated soil will be selected at the roadside,and open/idle areas near the construction site to make it convenient for the installation process.The temporary warehouse for materials such as iron, steel, cement, etc.,will be located by the contractors near workers' quarters, CPC grounds and/or rented people's land. The exact locations of the temporary storage yards will be agreed uponby the contractors and the local governments prior to the start of construction construction.
3.16 Methods on management and balance of excavated soil/surplus soil (if any)	The quantity of redundant soil during pipeline installation is very small, and these will be used to cover the trench dug, after the pipes have been laid in place underground.
3.17 Number and condition of vehicles and equipment	The installation of pipes will be done manually
4. OPERATION AND MAINTENANCE	
Water resource protection	The PPMU will request the PPC to issue a Decree declaring significant segments of Nam Sao and Nam Tien springs, several meters upstream and downstream of the intake structures as protection zone. Also, this guide-lines will also seek to regulate the establishment of water polluting establishments and agricultural activities upstream of the intakes.
a. Water treatment tanks	
4.1 Maximum supply capacity	The total capacity is 564 m^3/day
4.2 Procedures/standards for water treatment	The facility is design to treat raw river water through only physical means that shallremove debris, sediments and suspended particles in the water thru a series of filter tanks. The water quality of the process water after treatment,is expected to meet the standards prescribed under Technical National Technical Regulation on Drinking Water Quality of the Ministry of Health (QCVN 01: BYT/2009 issued on 17/06/2009);
4.3 Operations	TheDistrict People Committee of Sin HoDistrictwill take responsiblity for the operation and maintenance of the water supply system, including operations and maintenance of the WTP, and other ancillary facilities; as well aswater users fee collection. Trained operations personnelwill operate the subproject facilities, following the designprocess which have been developed by the design consultants. The processes include as follows: - Operation and maintenance of water treatment facility; - Protection of the Tanks and ancillary equipment; - Open/close regulating valves, airvalves, sediment discharge valves; - Management of sludges (i.e. debris, gross and fine particles collected in the filter tanks); - Check and remove (if any) garbage in the garbage-trapping screens at the raw water intake; - Check the water supply sufficiency forconsumers; - Regularly record respective consumers water meter readings(monthly) and collect water fee; - Check the supply systems daily, record the operating status of the system; - Regular cleaning of the facilities most especially the filter boxes and tanks. - Report to competent authorities relevant issues identified during operations and maintenance, to ensure the system is operated properly with the designed capacity.
4.4 Maintenance	The District People Committee of Sin HoDistrictwill take responsiblity for maintenance of the water supply systems. Water quality shall be tested for every three months and compared with QCVN 01:2009/BYT to ensure the quality of clean water.
b. Distribution and service system	

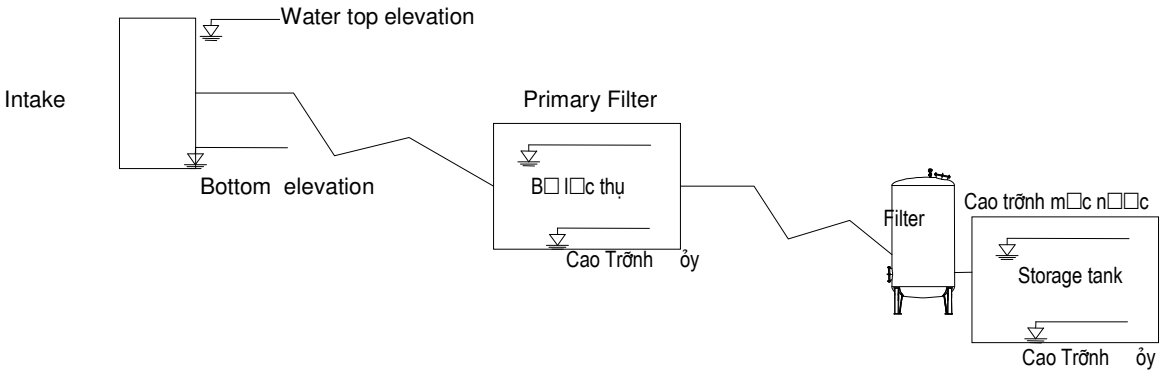
Description	Subproject data
4.5 Maintenance	The District People Committee of Sin HoDistrictwill take responsiblity for maintencane of the distribution and service pipeline. The maintenance activities consists of repairing and replacing broken valves, connectors and pipes as well as testing the pipeline for leakage. Water meters will be tested periodically every 5 years and replaced if necessary.
5. Resettlement and land acquisition[1]	
5.1 Number of affected households	The government is the owner of the affected lands, specifically the lotswhere the tankswill be constructed. While most of the affected land (no rental paid) is leased forest land by the Lai Chau Rubber company, this government company will gladly return the idle land to the government thru the CPC of Pa Than commune for use in the subproject. Thereareno HH which will be affected by land acquisition for subproject.
5.2 Number of severely affected households	None
5.3 Number resettled households	None
5.4 Total land area to be acquired (m^2)	530 $m^2$where 30m^2portion is public land under the CPC P Than commune, and 500$m^2$is leased government land (no rent paid) managed by the Lai Chau rubber company No 2).
5.11 Total affected assets	0
6. Subproject cost	
6.1 Total subproject cost (VND and US$)	25,000,000,000 VND (US$*1,179,245*)

FIGURE 1. SUBPROJECT LOCATION MAP

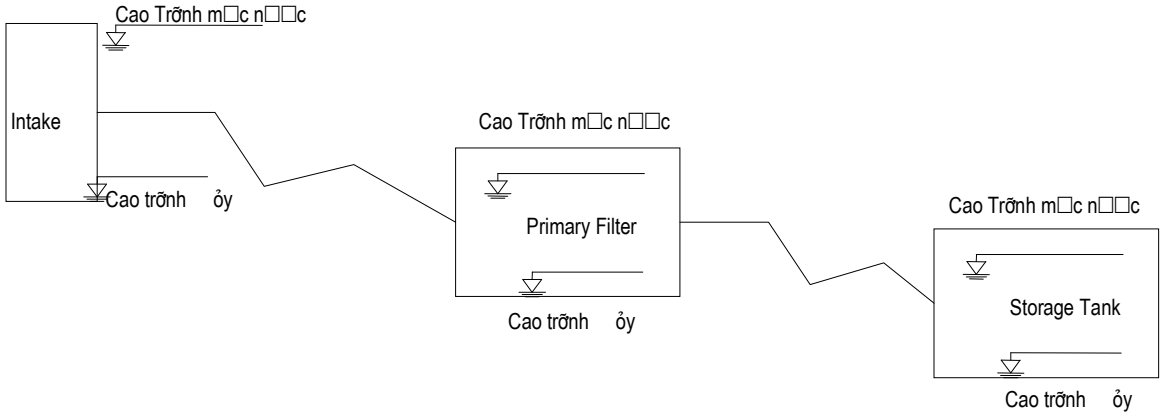
STT	ĐƠN VỊ HÀNH CHÍNH	DIỆN TÍCH (Km²)	DÂN SỐ (Người)	MẬT ĐỘ (Người / km²)
1	TX. Lai Châu	70,8	18 089	256
2	H. Mường Tè	3 678,8	47 400	13
3	H. Phong Thổ	1 028,8	56 500	55
4	H. Sìn Hồ	1 907,3	67 100	35
5	H. Tam Đường	686,6	40 700	59
6	H. Tân Uyên	903,2	42 221	46
7	H. Than Uyên	796,8	53 338	70
	Toàn tỉnh	**9 072,3**	**325 348**	**35**

FIGURE 2. WATER SUPPLY PROCESS FLOW

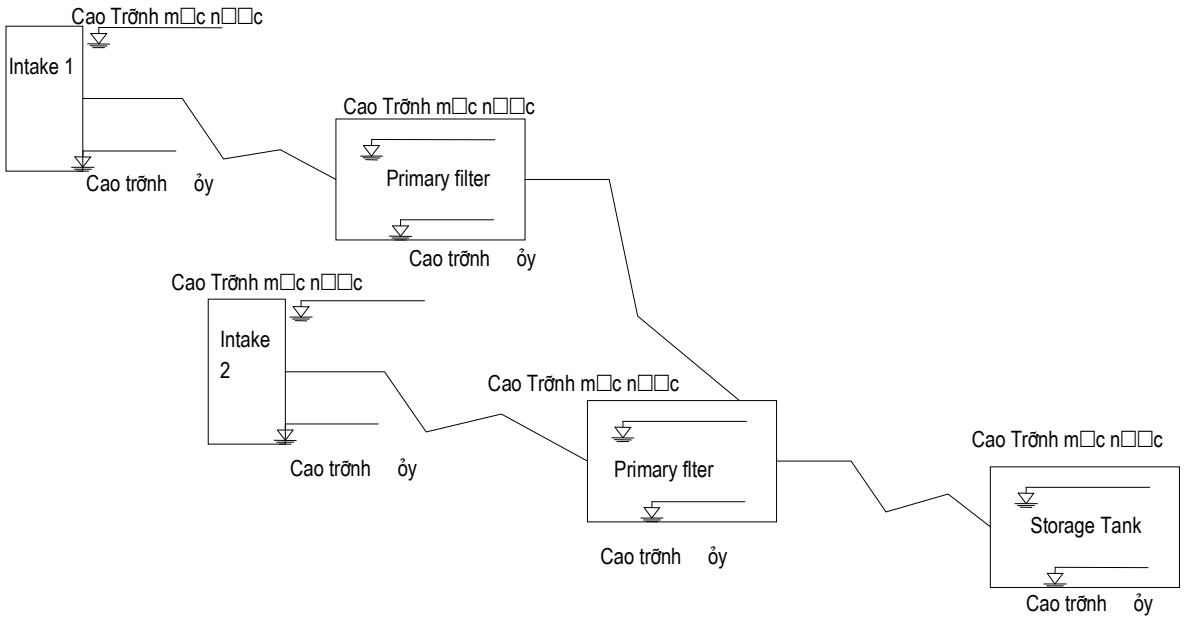
Source 1



Source 2 – Position 1



Source 2 – Position 2



DESCRIPTION OF BASELINE ENVIRONMENT

7. The environmental study area includes:i) Direct impact areas (DIA) are the plotof land on which theraw water intake structures, water processing/filtration tanks,raw and distribution pipeline pipelines will be installed/maintained;as well as the water resource protection zone; ii) Secondary impact areas (SIA) are the areas within 20 m surrouding the pipelines and 50 m surrouding the DIA; and iii) Indirect impact areas (IIA): 1,920,58 ha of the beneficiary commune.

Table 2.Baseline environment

Data Item	Subproject data
1. Project location	
1.1 Communes	Pa Tan
1.2 District	Sin Ho
1.3 Province	Lai Chau
1.4 Geographic location	Sin Ho share the border with China and Huoi Luong commune in the North; Hong thu communein the East, Nam Ban commune in the West and Hong Thu and Nam Ban communes of Phong Tho District in the South. Sin Ho district has 22 communes and 01 town. Pa Tancommune is located on the Northeast portion of Sin Ho district, and has 14 villages consisting of 816 HH with 3,759 persons and four Ethnic Minorities.
2. Physical environment conditions	
2.1 Air quality	At Pa Tan commune,the ambient air appears to be relatively clean without the industrial activities within the area.The sub-project is located in an isolated rural area, where traffic volume is low. The popular means of land transportation arebicycles, motorbikes, and a few 4-wheel vehicles.
2.2 Noise and vibration	Similar to the air quality (item 2.1 above),the noise and vibration levels within the subproject area are normally low. The only source of noise and vibration are few motorized vehicles (i.e. motorbikes, cars and trucks) that use the existing roads to transport people and farm products.
2.3 Weather and Hydrology	- Weather: +The subproject is located in an area where there are two seasons namely: the dry season that occurs from October to April,and rainy seasonthat lasts from May to September. The rainfall is minimal and distributedunevenly during the seasons. The yearly average rainfall is about 2,020 mm. Hydrology: Nam Tien, Nam Sao, and Nam Na springs are the main drainages of the Subproject area. Theseare tributaries of the Da River flowing on a Southeasterly direction, and are used primarily as the water source for irrigation; drainage, and waste water collection.
2.4 Topography	The subproject area is located within highland area that has from undulating to steep slopes and narrow valleys that is drained by a number of waterways.
2.5 Water Resources	**Surface water:** There is no river or large waterways within the subproject area. The local waterways are small to medium size. There are a number of waterways that drain the area, of these 3 (Nam Tien, Nam Sao)are tapped to provide the water source for existing and proposed water supply subprojects. The engineering design consultant of subproject had taken samples from the source and had them tested in government accredited laboratory for water quality. The test results (the details as in appendix 5) show that the water quality of local waterways is very good, only TSS that does not conform to Vietnamese standard for portable water, since it exceeds the maximum tolerable values. It is for this reason that a treatment plant with adequate filtration system had been designed to clear the raw water from the streams of sediments and suspended solids to a level that will conform to standards **Underground water** There is/noadequate groundwater resource within the DIA. The groundwater level as observed from existing wells have a depth ofabout 8-10m from the ground surface, depending on the season. Groundwater level will be shallow during the rainy months, and will inversly become deeper during the dry months. Local people claim that during the dry season, the shallow wells normally dries up, forcing them to fetch or buy water from other communes.

Data Item	Subproject data
2.6. Current situation of water supply	In addition to the existing delapidated water supply system, there are other existing water sources that the local peope are making use of which includes: **Dug well**: the water drawn from shallow wells is mostly used for bathing andwashing. About 30% of the local people are using ground water for their domestic needs. Local residents claim that the quality of ground water is not good. **Drillwell**: the water drawn from drill well is used drinking and cooking, but these had to undergo sand filtration process prior to use. About 20% of local people use water from drill wells. The water from the drill well however has bad odor and "fishy taste". **Rain water**: the rain water that is collected from corrugated house roofis primarily used for drinking and cooking purposes.The rain water iscolourless, odorless, and sweet-taste. **Others:** 30% of Local people installed small diamter plastic pipelines by themselves to mountain streams to divert water directly to their respective houses.
2.7 Terrestrial/aquatic flora and fauna	- Terrestrialflora: +Mainlyhorticultural crops (i.e. rice, corn, and cassava) are grown atthe lower regionsand somefruit trees (grapefruit, jackfruit, litchee, etc.)are plantedin residential areas. - Terrestrialfauna: + There are mainlydomesticated animals such as livestock (cattle, pigs) and poultry(ducks, chickens, geese) in this region. Based on the Red Book, there are no known endangered species in the areathat should be protected
2.9 Protected areas	There are noprotected areas foundwithin the DIA and SIA.
3. Social environment conditions	
3.1 UXO	The experiences from previous projects, and consultation with local people in the subproject area indicate no reports of UXO foundin this area. for the last 10 years
3.2 Land use	Within DIA, the dominant land used is agricultural, with paddy rice as the dominant crop. Low density residential areas are found mostly along the roads and clustered within villages.
3.3 Rural infrastructure	Roads: Pa Tan communeis located near provincidal and district road, which is convenient for vehicular traffic movement.In addition the provincial/district road has a narrow width of about 5m. In the DIA and SIA there are also some rural roads connecting the villages with maximum load capacity of up to 10 tons. These roads are mostly in poor quality and difficult to travel on during the rainy season. These roads have adequate ROW on which the pipelines are to be installed. It is only when the pipelines are to be connected directly to the houses when private lands will be traversed. The trenches dug to where the pipes are laid will be restored promptly after the installation is completed.

3.4 Population/estimated number of benificiaries of the subproject	**Population of Pa Tan commune** **Commune** / **Pa Tan** Household / 816 Number of persons / 3,759 Source: Pa Tan Statistic Office 2013 85% of the total population of the commune will be supplied with clean water The water users fee for usage of clean water is calculated in accordance with the Joint Circular 75/2012-TTLT-BTC-BXD-BNNon15/5/2012Guide on principles, andcalculatation method and authorityofwaterconsumptionratesintheurban, industrialandrural areas.
3.7 Ethnic minorities	Sin Ho district has 13 ethnic groups, the main group of which are Thai (32.51%), Mong (31.62%), Dao (20.89%), Kinh (5.67%), Lu (4.01%), Kho Mu (1.07%) and Mang (1.49%). Most of the local population of Pa Tan commune are EMs making up 85.87% belonging to the Thai, Mong and Mang tribes.The average populationdensity in the commune is32.69personper km^2which is lower than the District figures in 2013 (Source: Sin Ho Statistic Office 2013)
3.8 Livelihoods	The income source of local people is mainly from agriculture (i.e. growing paddy rice/sugar cane/timber/livestock/poultry raising/aquaculture); trading/services. Industries such as manufacturing/handicraft/trading/services are underdeveloped.

<table>
<tr><td></td><td>Economic developmentremains slow.
Livelihood of Local People in the subproject communes<table><tr><th>Industries</th><th>Pa Tan</th></tr><tr><td>Agriculture/ Forestry</td><td>90%</td></tr><tr><td>Other industries</td><td>8%</td></tr><tr><td>Trade and services</td><td>2%</td></tr><tr><td colspan="2">Soure: PMU Lai Chau</td></tr></table></td></tr>
<tr><td>3.9 Cultural, andheritage Sites</td><td>There areno cultural or heritage site in the subproject area;</td></tr>
<tr><td>3.10. Public healthcare</td><td>Each subproject commune has 1health station with about4 staff and about 7 beds per station.</td></tr>
</table>

III. ENVIRONMENTAL IMPACT SCREENING

8. An environmental impact assessment is a study of the possible positive or negative impact that a proposed subproject may have on the environment.The study will cover the physical, biological and socio-economic aspects. To identify and evaluate the impacts of any one subproject, there are various methods commonly used for environmental impact assessment such as check-list method; matrix method; The Battelle environmental evaluation system; and cost-benefit analysis method.The check-list method was used, which is widely used and generally sufficient for small scale subprojects having Category B classification.

Table 3.a. Environmental impact screening for Raw Water Intake and Water Treatment Plant

Impact	Potential impact				Brief description of impact location and scope
	Is impact likely to occur yes /no?	Is it minor or significant ?	Is it positive or negative ?	Is it temporary or permanent?	
1. Pre-construction stage impacts					
1.1 Disturbance when exploring UXO	No				The subproject facilities is to be constructed in an area where there had been no reported incidence of accidents related to explosion of unexploded ordiance for the last 10-20 years.
1.2 Loss of residential land,agricultural land and other private assets.	No				The subproject will require the acquisition of about 30 $m^2$of idle land managed by Pa Tan CPC and 500m^2 of leased forest land managedby the Lai Chau rubber company No 2 to be used for the construction of the filter tanks and their ancillary facilities.
					The impact is not significant. The affected entities had agreed to handover the land to the subproject at no cost. A Due Diligence Report had been prepared to describe the process undertaken leading to the voluntary handover of the lands to the subproject.
1.3. Impacts on cultural or heritage sites such as tombs, pagodas, etc.	No				There areno cultural, heritage sites within DIA of subproject.
2. Construction stage impacts					
2.1 Siltation of Irrigation Canal near the pipeline alignment by earthworks	No				The raw water intake pipelines will only cross the rural roads from intake works to the WTP sites and the current irrigation canals are not expected to be influenced by the installation of these pipelines.

2.2 Pollution of the Nam Tien, Nam Sao springs, irrigation canal and other water resources due to waste water or spent oil and grease from construction equipment and vehicles	Yes	Minor	Negative	Temporary	The construction of the subproject may cause the production of waste materials during the process of construction or maintenance of equipment/vehicles and workers camp domestic activities. For example, cleaning of equipment and vehicles near/on the Nam Tien, Nam Sao springs may cause water pollution due to oil, grease, and lubricants washed from the units. The worker's camp is also one source of waste water. Estimated volume of wastewater is about $10m^3$ per day. This amount (waste water) if untreated, can cause water pollution if discharged directly into the receiving water (i.e. stream,). Water pollution related to accidental discharge of petroleum products during construction phase, are manageable activities which only requires close supervision, and proper handling of the liquid waste and disposal using DONRE accredited companies. This impact is minor due to: i) few number of construction vehicles/equipment needed for construction activities which may include transporting filling materials; and hauling of other construction materials to build the filter and storage tanks(5-6 trucks)and raw water intake pipeline, excavation of soft soil and compaction of new fill; whose combined waste volume is minimal and can easily be handled by contractor's maintenance crew; ii) No workers camp is to be built and only a field office will be established complete with sanitary toilet capable of handling of minimal office related domestic waste;iii) installation of the raw water intake and pipeline will be by manual method and so no petroleum leakage is expected towards the Nam Tien, Nam Sao springs and iv) short construction period; Location: Construction site (i.e. intake structure, tanks and pipeline alignment) Duration: 12 months for construction activities
2.3 Loss of terrestrial and aquatic flora andfauna	No				The site on which the Intake structures will be built have no vegetation growing on them. The site for the tanksare currently idle forest lands (total area of $550m^2$). While the pipeline alignment are mostly to be buried along the existing road ROW which is devoid of vegetation.

2.4 Dust, noise and exhaust fumes from construction activities	Yes	Minor	Negative	Temporary	During entire construction of the SP (i.e. intake, raw water intake pipeline and tanks) the equipment assisted activities as enumerated below will cause negative impacts such as dust resuspension, noise, vibrations and exhaust gases that may affect the health of local residents due to: - The operation of construction equipment and vehicles (such as back hoe, crane, compactor, concrete mixer); - Transport of materials and waste (about 5 trucks capable of 10 tons per day); and - Earthwork activities. High amount of resuspended dust and exhaust gases can cause respiratory or lung disease in humans if exposed to the contaminants for a long period.
					The impactis minordue to; (i) The terrain in the subproject area is open and well ventilated so air pollutants can easily be dissipated by the wind; (ii) The landuse surroundingthe subproject facilities and pipelines is predominantly agricultural and forest lands with much trees and crops, so the noise that may be generated from the constructon works can easily be absorbed by the environment; (iii) The subproject facilities will be constructed within isolated areas, the closest residential areas are 200 m away from construction sites, (iv) the number of vehicle/equipment (total about 5 trucks per day) that will pass through the public road is few and not enough to generate much emissions and noise; Location: Construction site and transport road alignment. Duration: 12 months of construction activities

2.5. Obstruction to local vehicle traffic or to private property access	Yes	Minor	Negative	Temporary	The installation of pipelines will use the side of the local roads which is still government land, may cause possible obstruction to vehicular traffic or deter access to private properties along the road side. While not yet installed, the pipes may be placed on the roadside while awaiting installation. Similarly, the excavation process of the trenches onto which the pipes will be laid, will result in temporary stockpiling of earth of the roadside thus serving as obstruction to vehicular and pedestrian mobility. Similarly,the construction vehicles will use the existing rural roads to transport building materials and waste. Overloaded transport (beyond road capacity) can cause the degradation of existing rural infrastructure such as road, bridges, and culvert,as well as cause traffic congestions at the sensitive areas such as markets, schools, medical station, CPC office, etc. specially during the rush-hours. This impact can be considered minor due to: a) few number of vehicles that will use the national highway (5 trucks of 10 tons/day for transporting materials for the construction and minor waste for a very short time); b) there are no residents living near the intake structures and tanks; c) the pipeline alignment only crosses the local rural roads, and so excavated materials can be temporarily placed on the idle areas beside of the roads to avoid traffic obstructions; d) materials (i.e. pipes, pipe fittings, etc.) for the pipelaying will be placed on the side of the road, so there will be no obstruction to the flow of vehicular traffic; nor prevent access of local people to their land and other assets; and e) the excavated earth created as a result of the installation of the intake pipelines will immediately be returned to the trenches dug as soon as the pipes are laid. Location: local rural roads whose ROW will be used to install the pipeline network. Duration: 12 months of construction time

2.6. Employment or livelihood benefits from employment of local people	Yes	Medium	Positive	Temporary	If local people will be employed in the construction by civil works contractors, the following benefits may arise: a) Direct hiring of local labor will provide employment opportunities to the local people (about 50% of 60 persons) most of which may be agriculture seasonal labor (planting and harvesting of crops); b) Income gained from the short-term income due to subproject construction, if properly handled can be used as seed capital for business expansion or for investment in household children's education. c) The relationship between contractor and local people may become close and thus beneficial for both parties and for the subproject's sucess. It is for these reasons thatcontractors are encouraged to employ local labour during construction to perform such work as: land excavation, installation of water pipes, collection and transport of construction materials and waste cleaning, etc. Likewise, local women should be given equal employment opportunityand salary scale as men. d) Workers will rent local house as their accomodations during the construction period which will provide additional income for local people. Location:Pa Tan commune Duration: 12 months of construction time
2.7. Generation of solid waste that need to be properly disposed of	Yes	Minor	Negative	Temporary	The construction of tanksonly generate200-400 $m^3$of excavated soil, this soil volume is so small and can use as back-filling material for trenches excavated to install the pipelines. Also, the construction activities will generate construction solid wastes which include among others broken concrete pieces, old broken pipes, glass and wood, etc. that cannot be used for the works. Other waste may be in the form of packaging, cans and debris. Solid waste that is not properly disposed of can: a) occupy land that can not be used for agriculture production thereby reduce productivity in the subproject area; b) serve as a safety hazard to local people most especially if the waste include broken glass, rusting metallic containers, sharp concrete slabs, etc; and c) destroys the aesthetic value of the landscape. The impact can be considered as minor for the following reasons: a) There is small volume of surplus soil from the excavated activities for construction of the tanksbut this volume can easily handle by local filling requirement; b) The excavated materials may be reused as backfill for the intake pipeline when installation is completed; Location: Sites of tanks, intake works, pipelines Duration: 12 months construction period

2.8. Generation of additional domestic waste that may contaminate the ground water	Yes	Minor	Negative	Temporary	The operations of the worker's camp and construction sitewould yield the generation of domestic waste from the construction workers. It is estimated that about 24 kg domestic solid waste for 60 workers will be generated per day (0.4 kg/person/day X 60 persons). If these waste are not properly disposed of, these can be washed by surface water run-off into the Irrigation cannal and further contaminate it. Also, untreated raw sewage if directly discharged into the ground, may also contaiminate the ground water. Already, the ground water had exhibited slight contamination (with odor and unusual taste), so further contamination may occur if the worker's domestic waste is not properly treated. The impact can be considered as minor for the following reasons: a) aWorkers camp will be established with bins for domestic waste and sanitation toilets. In addition, local houses are likely to be rented for the migrant workers to stay during the duration of the construction period; b) local labor will be hired which will reduce the additional domestic waste expected to be generated; c) Sanitation related issues are manageable using standard toilet design and existing procedures prescribed by the Ministry of Health; and d) Enforcement of worker's personal hygene and sanitation is a manageable task that the civil works contractor should be able to handle Location:Worker camp, Rented house for workers accomodations, and construction sites Duration: 12 months of construction time

2.8. Risks to public or construction worker health and safety	Yes	Minor	Negative	Temporary	Risks on construction related accidents which are caused by improper and unreasonable use of construction devices such as back hoe, compactor, crane, electric generator, etc. Acceleration of construction work done during the rainy season may put construction workers at risk most especially those involved in the installation of raw water intake pipeline which may be caught by flash floods or high and strong water flow ofNam Tien and Nam Sao springs. Dust, construction vehicle emissions, noise and vibration are mainly caused by the operation of construction equipment and vehicle, which can affect the health of workers on site as well local residents who are exposed to these contaminants for long periods. These risks are minor due to the following reasons: a) Per subproject design, major construction work (which includes installation of the intake pipeline, tanks) will mostly be done during the dry months so risk due to flooding is remote; b) Construction activities in the installation of intake pipeline (i.e. digging of shallow trenches and laying of pipelines)are mostly manual, and so there is no public risk due to heavy equipment mis-use; c) It is the earthworks on the WTP and hauling of redundant soil, backfillingand solid waste that heavy equipment is used. Since much of the heavy equipment use is focused on the tanksites (backfilling of the tanksites, compaction, installation of facilities) where there are no local residents, safety risk to local people will only be limited to those who choose to illegally enter these construction site; d) There are only a few number of construction vehicles (about5 trucks per day), that will produce minor emissions and low noise level. Besides the terrain and landuse of the subproject area is such that these air pollutants can easily be dissipatedby the wind; and noise absorbed by the existing vegetation. Location: Construction sites, material transport routes Duration: 12 months of construction time

2.9. Social impacts by migrant workers at construction site to local communities	Yes	Minor	Positive and Negative	Temporary	i)-Positive impacts: Cultural exchange between local residents and migrant workers, Livelihood opportunity created by the increase demand of other support services such as food, entertainment, housing, laundry, etc., that can be provided by local people ii)-Negative impacts: social evils as theft, illegal drugs and prostitution, might occur in subproject area The impact can be considered minor for the following reasons: a) handling migrant workers is a manageable task which the civil works contractor should be able to do; and b) At least 30-50% of labor arefrom the local community. Location:Pa Tan commune Duration: 12 months of construction time
2.10. Effects on nearby heritage items such as graves, pagodas etc.	No				There arenoheritage nearby construction sites
2.11. Other impacts in quarries for material construction on dust, noise, working safety and water or soil pollution by exploitation activities	No				Per subproject design, the construction materials will be sourced from companies licensed by government authorities. The subproject doesnot need to open new quarries as source for construction materials.
3. Operation stage impacts					
3.1 Improvement of the health and sanitation conditions of local people within the subproject site.	Yes	Significant	Positive	Temporary	The subproject will supply clean water to the 3,136 people of Pa Tan commune of Sin Ho district.Currentlymost of them had to fetch their drinking water from shallowwells that are contaminated.The subproject will contribute to the improvement of the health and sanitation of the beneficiaries with the provision of clean potable water. Also, this will allow the local people, most especially the women to use their saved time to do other productive undertakings. Location: Pa Tan commune

3.2. Water pollution of the water resources protection zone and adversely affecting its aquatic environment due to waste water from the treatment plant	No				The production of wastewater comes from backwash process -. Wastewater containing the debris and solids removed from the filters during maintenance work. Since no chemicals will be used for treating the filtered water, the waste water is not expected to harm theenvironmental .
3.3 Creating opportunities for employment for people in the subproject area	Yes	Minor	Positive	Temporary	When the subproject is completed, it will include a management, operation, and maintenance systems, that contributes to creating job opportunities for part of populationin and around the subproject area. Location: Pa Tan commune
3.4. Excessive exploitation of surface water and groundwater will make water supply capacity of the environment unable to catch up with other local water needs and/or cause conflicts among households	No				i) Underground water is not used for the sub project ii) The raw water source is the Nam Tien, Nam Sao springs which has large discharge which at times cause flooding of adjacent area. In view of this, it is most unlikely that the water needs of other beneficial users downstream of the source will be significantly affected by the subproject drawing a few cubic meters from the River.
3.5.Sludgeman agement	No				The operation of SP does not generate sludge due to use only physical primary and secondary tanks without chemicals
3.6.WTP Chemical contamination of the Nam Tien, Nam Sao springs	No				The operation of SP does not require to use any kinds of chemical

Table 3.b. Environmental impact screening for Distribution and service system

Impact	Potential impact				Brief description of impact location and scope
	Is impact likely to occur yes /no?	Is it minor or significant ?	Is it positive or negative ?	Is it temporary or permanent?	
1. Pre-construction stage impacts for					

1.1 Disturbance when exploring UXO	No				The transmission and distribution pipelines run along existing road ROW (i.e. provincial road and inter-communal roads and village roads) which is clear of UXO. There are no case or casualty caused by bomb-mine explosion in the sub-project area in the last 20 years.
1.2 Impacts on households from loss of residential land or agricultural land	No				There are no lands nor assets expected to be permanently affected by the pipelaying activity. Shallow excavations will be made at the side of the existing road where the main pipelines will be laid, as well as the short section from the main pipeline to the residential areas where water meters and later faucets are to be installed. Temporary use of land may be necessary for temporary storage of construction materials and waste during subproject implementation, however, these affected lands will be fully restored after the works had been completed.
2. Construction stage impacts					
2.1 Siltation of Irrigation Canalnear the pipeline alignmentsby earthworks	Yes	Minor	Negative	Temporary	During earth moving activities related to the installation of main and distribution pipeline, excavated soil are likely to get wash off by surface water run-off from the waterway, rain and into the water-ways. Similarly, materials hauled into the construction site by transport trucks may also fall off from these vehicles and intolocal irrigation canal and waterways. Excavated materials, debris, and other waste materials that get washed into thelocal irrigation canal and waterways can cause sedimentation, and deterioration of the water quality. Among the immediate impact is the increase in the turbidity of the waterways. The impact is considered to be minor for the following reasons: a) construction works will be done mostly during the dry season when there are minimal if any rains; b) the construction of the subproject is expected to yield very minimal spoils in the amount of (200-300m^3) and most if not all of it will be used to backfill the tranches dug to install the main and distribution pipelines; and c) the construction period is short at 7 months. Location: local irrigation canal and waterways. Duration: 6 months for installation of pipelines

2.2.Damage to other infrastructure during trench excavation and installation of main and distribution pipelines	Yes	Minor	Negative	Temporary	Installationof the main and distribution pipeline network requires the digging of shallowtrenches into whichthe pipelineswill be laid mostly along roads/paths and near houses, electric and communication poles. During the installation process, it is possible that damages may be incurred on the adjacent properties/assets. The impact is minor due to: a) most of the pipeline will be installed along the side of the existing road which is owned by the government and no improvements are located; b) the maximum depth of the shallow trench for the bigest pipe DN is only 1m and so minimal disturbance if any will be caused by the work; and c) the installation will be done manually sowork can proceed without causing serious damages on the structures nearby; In addition, the trenches on which the pipes will be laid, will be filled up by multiple layers of different filling materials to protect the pipes. This will decrease the risk of slide or subsidence of the structures nearby. Location: Along the pipeline network within thePa Tan commune Duration: 6 months of construction time

2.3. Disturbance to local people/businesses	Yes	Minor	Negative	Temporary	Disturbance to local people/business during excavation work for pipe laying, material and waste handling, operation of construction equipment and personnel is unavoidable. As a result, interruption of business, loss of playing grounds for children, accessobstruction toprivate propertiescan be foreseen Temporary storage of excavated soil and debris from the trences and pipingmaterialson the roadside maycause, narrowingof publicroads, thus making the movement of vehicular traffic and pedestrians thru the road segments where there are ongoing pipe laying works,difficultand may even be hazardous if stock piles and excavations are not properly fenced off, and lighted during the night. This impact can be considered minor due to: a) few number of construction vehicles (10 trucks/day for the pipeline network) needed to transport materials; b) Most of excavated soil (90%) will be reused as filling material, the remaing amountfor whole pipeline to be used in the backfilling of the tankgrounds; c) time for temporary storage of spoil is short; d) the excavation work is mostly done manualy, and only the delivery of construction materials and hauling out of waste will be the equipment supported activities, so disturbance in terms of noise, vibrations, dust and emissions are minimal; e)the construction sites are located within rural areas where the space for construction sites (road side) is wide, normally idle and that trading activities are minimal and normally held once a week at the center of the village during market day. Location: Residential and institutional areas along the pipeline within thePa Tan commune Duration: 6 months of construction time

2.4 Dust, noise and exhaust fumes from construction activities	Yes	Minor	Negative	Temporary	During the pipe laying process, the activities as enumerated below will cause negative impacts such as dust resuspension, noise, vibrations and exhaust gases that may affect the health of local residents exposed to the pollutants: - The operation of construction equipment (compactors) - Transport of materials and waste; and - Earthworks (manual excavation of trenches and backfilling) Every day dring the construction phase, there are about 5-6trips to be made by construction trucks that will use the public roads thru the 4beneficiary communes where pipelaying work are to be done. High amount of dust resuspended and exhaut gases emitted by the transport vehicles if these gets to residential areas, can cause respiratory or lung disease in humans. Noise can disturb nomal living activities of local people such as lunch sleeping, studing, office work for government employees, etc. The impactis minordue to; (i) The terrain in the subproject area is open and well ventilated so air pollutants can easily be dissipated by the wind; (ii) The subproject pipeline that crosses through residential areas, that have low density population, so the number of persons affected would be minium; iii) much of the pipelaying is to be done manually, so it is only in the delivery of materials that the few vehicles are to be used in the work. Location: along the pipeline alingmentlocated inPa Tan commune Duration:6months of construction activities
2.4. Affects on traffic or conditions for property access	Yes	Minor	Negative	Temporary	The Construction vehicles and trucks will use the existing rural roads to transport building materials and waste. Overloaded transport (beyond road capacity) can cause the degradation of rural infrastructure such as road, bridges, and culvert,as well as cause traffic congestions at the sensitive areas such as markets, schools, medical station, CPC office, etc. specially during the rush-hours. This impact can be considered minor due to: a) few number of vehicles (5-6 trucks/day for each commune) needed to transport materials; b) Short travel distance of transport trucks from material sources to construction site about 10km away; c) Pipelaying work is mostly manual, so no heavy equipment such as back hoe is expected to used that may cause obstruction to the flow of local traffic during construction activities. Location: Markets, schools, residential areas and rural roads in the Pa Tan commune Duration: 6months of construction time

2.5. Employment or livelihood benefits from employment of local people	Yes	Medium	Positive	Temporary	If local people will be employed, construction by contractors the following benefits may arise: a) Direct hiring of local labor will provide employment opportunities to the local people (about 50% of 60workersfor Pa Tan commune) most of which may be agriculture seasonal labor (planting and harvesting of crops); c) Income gained from the short-term income due to subproject construction, if properly handled can be used as seed capital for business expansion or for investment in household children's education. d) The relationship between contractor and local people may become close and thus beneficial for both parties and for the subproject's sucess. It is for these reasons thatcontractors are encouraged to employ local labor during construction to perform such work as: land excavation, collection and transport of construction materials and waste, cleaning, etc. Location: Pa Tan commune Duration: 6 months of construction time
2.6. Generation of solid waste that need to be disposed properly	Yes	Minor	Negative	Temporary	The construction activities will generate: - About 16kg domestic solid waste for 40workers per day (0.4 kg/person/day X 40persons) for whole pipeline network - Other construction solid wastes include among others broken concrete pieces, crushed stone, broken wood, etc.that cannot be used for the works.Other waste may be in the form of packaging, cans and debris. The solid wastes listed above can smear the aesthetics of the local landscape as well as affecting site sanitation if domestic waste are likewise not properly collected and treated prior to discharge. The impact is considered minor for the following reasons: a) The amount of solid waste produced is at 16 kg of domestic wasteis minimal and can easily be disposed of in the CPC garbage facility; b) migrant workers are to rent local house/s for their accomodations; c) local workers are to be hired so lesser additional domestic waste is expected to be generated. Location: construction sites, Duration: 6 months of construction time
2.7. Risks to public or construction worker health and safety	No				The nature of construction work are not hazardous (i.e. excavation, and pipe laying,.) and that the workers are not exposed to hazardous environment (ie. Flood prone areas, landslide prone areas, none use of explosives, etc.)

2.8. Social impacts by hiring of migrant workers to local communities	Yes	Minor	Positive and Negative	Temporary	i)Positive impacts: Cultural exchange between local residents and migrant workers, Livelihood opportunity created by the increase demand of other support services such as catering, entertainment, housing, and laundry; that can be provided by local people ii)Negative impacts: social evils as theft, illegal drug useand prostitution, might occur. However, the social evils can be minimized with strict management of migrant works by the constractor, and proper selection of works. Hiring of more qualified workers will also lessen the social related problems. Location:Residential areas within Pa Tan commune Duration: 6 months of construction time
2.12. Effects on nearby heritage items such as graves, pagodas etc.	No				There are no heritagenor cultural assets (i.e.graves, pagodas, churchs, etc.) within 100m surrounding the pipeline alignment.
2.13. Deterioration or loss of sensitive flora	No				The main and distribution pipelines pass throught idle areas whereshrubs and grasses is the dominant species. There are no reported endangered or rare florawithin the DIA or SIA.
2.14. Other impacts in quarries for material construction on dust, noise, working safety and water or soil pollution by exploitation activities	No				Per subproject design, the construction materials will all be sourced from companies licensed by government authorities. The subproject do not need to open new borrow pitsas source for construction materials.
3. Operation stage impacts					

3.1. Operations and Maintenancerelated issues	Yes	Minor	Negative	Temporary	Duringoperationof thewatersupplysystem,deteriorationofpipelinesisunavoidable. Problems related to “wear and tear” of the system such as broken valves, pipe leakage/rupture,worn-out parts oreven obstructioninsidethepumpsand pipe,faulty electrical wirings and others may occur. If these system maintenance problems arenot detectedat an early stage, bigger problems may arise and disrupt the supply of clean water thereby depriving the local people of water for their domestic use. Further delays in the restoration of water services may lead to health and sanitation problems which this subproject intended to solve in the first place. Similarly poor maintenance work can also lead to inefficient system operations, where much water is lost thru leakage along the pipelines. If the water losses called “non-revenue water” is not reduced, then money paid by the waterusers may not be enough to pay for the cost of water treatment and distribution. When this happen, the subproject may have to stop operations if no subsidy is provided by the Province to pay the cost of operations meantime repairs are being done on the broken facility. Similarly, some sections of the pipeline runs along the side of main roads such as provincial road and inter-communes roads,which will be at risk of breakagein case that these roads are upgraded or re-constructed. Unless all concerned government agencies are informed on the location and depth of these pipelines, then possible damage caused by diggings, excavation or even simple plowing of the land over which the pipes are buried, may cause damage or worst rupture of these PVC pipes, leading to significant to serious water loss that needs to be addressed immediately. The impact however is avoidable with much vigilance of the managing unit responsible for the operations and maintenance of the water distribution system. The pipeline network is also located on stable geologic area with no history of serious earthquakes, the risk of pipes broken by natural hazards is very low. In view of this, the impact is considered as minor.

IV. OUTLINE ENVIRONMENT MANAGEMENT PLAN (EMP)

A. Environmental Mitigation Plan

Table 4.a.Environmental Management Plan for:a. Raw Water Intake Structure, and WaterTanks

Potential impacts	Mitigation measures	Responsibility	Cost
1. Pre-construction stage			
None			
2. Construction stage			
2.1 Siltationof irrigation canal by earthworks	+ Construct raw water pipeline during the dry months; + As much as practicable maximize the use excavated soil meeting technical standards as fill materials.	Contractor	Included in the contract with the Contractor
2.2 Pollution of drainage cannalleading to Nam Tien, Nam Sao springs due to waste water or spent oil and grease from construction equipment and vehicles that are discharged or washed by surface water into the waterway.	+ Store hazardous materials (i.e fuel, oil, grease, other petroleum products) in safe areas with dry concrete floor and waterproof roof; + Ensure construction equipment and vehicles are maintained in good working condition following manufacturer's manual; + Supply 02 latrines for construction site as well as for worker's camp; + Regularly collect and properly deposit excavated soil to designated desposal site/sto avoid causing sedimentation of waterways(i.e. canal, receiving stream/river); + Discharge of waste materials directly to drainage canal is forbidden. + Vehicle/equipment Washing at the stream/river is prohibited + Avoid the river/stream water pollution due to oil fromequipmentand vehicle cleaning on or beside the waterway. Waste water from cleaning equipment must be controlled, isolated from natural water resources	Contractor	Included in the contract with the Contractor
2.3Dust, noise and exhaust fumes from construction activities	+ Cover the cargo of all trucks carrying dispersible construction materials and waste; + Ensure vehicles and construction equipment are maintained in good working condition following manufacturer's manual,and promptly repair them for any damage or oil leaks; + Drivers of construction vehicles and trucks to observe speed limits (15 km/h) most especially when passing residential and institutional areas;	Contractor	Included in the contract with the Contractor
2.4Obstruction to local vehiculartraffic or to privateproperty access	+ Inform local people& communities in subproject area about construction schedule most especially the transport route of trucks bringing construction materials and waste.	Contractor	Included in the contract with the Contractor
2.5. Generationof solid waste that need to be properly disposed of	+ Dumping solid waste outside of areas identified is prohibited + As much as practicable, reuse excavated	Contractor	Included in the contract with the

Potential impacts	Mitigation measures	Responsibility	Cost
	materials as backfill; + Regularly collect solid wastes in the construction site,store them at temporary safe areasnot suseptible to flooding, and transportthem to identifieddisposal sites. + Provide waste receptacles, locate them in strategic places at the worksite and camp, and regularly collect, transport and deposit these refuse to identified waste disposal areas; + Install toilets at work place and worker's camp following Ministry of Health standards.		Contractor
2.6Risks to public or construction worker health and safety	+ Designation of Safety officers and train them on health and safety procedures, and first aide. + Contractor need to inform commune PC and local residents about construction activities and schedule, and safety risks in order to strengthentheir awareness. + Provide safety equipment to workers like mufflers, gloves, and safety belt and train them in its use. Functional agencies always check and supervise works on labor safety of workers at site and residents within the construction area; + Regularly implement workcondition inspection to ensure occupational safety in the construction area; + Secure construction site and restrict access by local community by installingwarning signs in strategic places, and fencing off the construction area.	Contractor	Included in the contract with the Contractor
2.7. Social impacts by workers at construction site to local communities	+Orient migrant workers on ways of communicating with the local community as well as information on local culture; + Orient workers on personal health and sanitation, as well as prevention of contagious diseases; + Exploitation of local natural resources are prohibited; + Orient workers on the prevention of communicable diseases such as HIV/AIDS, and refraining from doing social evils like theft, prostitution, violence and use of prohibited drugs.	Contractor	Included in the contract with the Contractor
3. Operation stage			
3.1 Water pollution of the subproject's water source	+ Withinthe immediate vicinity of the Nam Tien, Nam Sao springs intake,no major construction,diggingof toilet or garbage pits,wastedumping, nor anylivestockraising activitiesarepermitted totakeplace. + Conductpublic awareness of sanitation among the local community thru public meetings, loud speakers, information materials posted in the CPC bulletin board. This is done in order to adviselocal people to comply with government regulations onwater exploitation and water use, wastes disposal, breeding, use of pesticides and fertilizers + It is also equally important from the local	Sin HoDistrict People Committee	Local budget

Potential impacts	Mitigation measures	Responsibility	Cost
	authority side to put forward clear administrative measures and regulations in order to strictly secure the compliance with the regulations and help protect the water source and keep a good sanitation situation. This will include issuance of a Decree declaring an area 100m upstream and downstream of the intake structure as Protection Zone where no human activity will be allowed. Enforcement of the Decree will be the responsibility of the CPC with local people volunteers.		

Table 4.b. Environmental Management Plan for distribution and service pipeline

Potential impacts	Mitigation measures	Responsibility	Cost
1. Construction stage			
2.1. Damage to other infrastructure during excavation/construction	+As much as practicable, reduce the installation time for the pipeline, +As much as practicable reduce the restoration time for the roadside and access to private properties affected by the digging, pipelaying and backfilling works; +Install sign boards, indicating the speed limit of construction vehicles at 15 km/h along residential areas + Promptly remove, temporarily material storage and deposit excess excavation materials (if any) from diggings to designated desposal sites; most especially for segments of the pipeline that cross or beside waterways, drainage and irrigation canals.	Contractor	Included in the contract with the Contractor
2.2. Disturbance to local people/businesses	+ Inform local leaders and residents of the construction activities and schedule in advance thru public meetings, loud speakers, and information materials in the CPC bulletin board; +Minimize as much as practicable, the length of time to do pipelaying works for every segment without necessarily sacrificing the quality of work. + Excess excavation materials to be regularly removed, temporarily stored in suitable areas, transported and deposited in approve disposal site, + Allow requests from local residents for use of spoils as backfilling material to their private lots so long as these are not located in environment sensitive areas which include beside the banks of the water source.	Contractor	Included in the contract with the Contractor
2.3Dust, noise and exhaust fumes from construction activities	+ Cover the cargo of all trucks carrying dispersible construction materials and waste; + Ensure vehicles and construction equipment are maintained in good working condition and promptly repair for any damage or oil leaks; + Spray water on the access roads, increase water spraying frequency along residential areas	Contractor	Included in the contract with the Contractor

Potential impacts	Mitigation measures	Responsibility	Cost
	crossed; + Drivers of construction vehicles and trucks to observe speed limits (15 km/h) most especially when passing residential and institutional areas; + At the sections through residential areas, construction activities that make excessive noise such as excavation, compaction of backfilled trenchesor unloading of construction material are not allowed to be done during resting times such as the afternoonnap and evening (after 21h);		
2.4Affects on traffic or conditions for property access	+ Inform local people& communities in subproject area about construction schedule most especially the transport route of trucks bringing construction materials and waste. + Coordinate with local authorities in providing traffic aide that can assist in facilitating the movement of vehicles through the roads beside construction areas.	Contractor	Included in the contract with the Contractor
2.5. Generation of solid waste that need to be properly disposed of.	+ Dumping solid waste outside of identified disposal areasis prohibited + As much as practicable, maximize the use excavated materials such as backfill; + Regularly collect solid wastes and store them at temporary safe areasnot suseptible to flooding, before transporting and disposing them to the approved dumpingsites.	Contractor	Included in the contract with the Contractor
2.6Risks to public or construction worker health and safety	+ Designate Safety officers to enforce health and safety measures in the work place, and train them on their work including first aid; + Contractor need to inform commune PC and local residents about construction time and traffic-related safety risks in order to raise their awareness and vigilance. + Provide safety equipment to workers like gloves, helmets, raincoats, etc. Functional agencies should check and supervise works on labor safety of workers at site and residents within the construction area;	Contractor	Included in the contract with the Contractor
2.7. Social impacts by migrant workers at construction site to local communities	+Orient migrant workers on ways of communicating with the local community as well as information on local culture; + Orient workers on personal hygeneand sanitation, as well as prevention of contagious diseases; + Exploitation of local natural resources are prohibited; + Orient workers on the prevention of communicable diseases such as HIV/AIDS, and social evils like smuggling, prostitution, violence and stealing.	Contractor	Included in the contract with the Contractor
3. Operation stage			
3.1. Operations and Maintenancerelated issues	+ Conduct regular and periodic maintenance work following standard procedures for distribution systems;	Lai Chau Water Supply Joint –	Operation cost

Potential impacts	Mitigation measures	Responsibility	Cost
	+ Provide personnel with suitable equipment and training on their use to ensure proper upkeep of the distribution sytem; + Promptly repair damagedsectionsof thepipeline network. + Orient water system service subscribers on water conservation, the use and upkeep of their respective faucets, and to report any leaks they see on the piping network, or any sudden weak water pressure to the water service management company for their immediate repair of the broken facility. This can be done thru public meetings, loud speakers, information materials posted at the CPC bulletin board.	Stock Company	

B. Environmental monitoring plan

1. Environmental impact monitoring

9. Monitoring the environmental impact was conducted to assess project impacts related to the ambient conditions.

Table 5.aThe environmental impact monitoring plan for the Intake Pipeline and Water treatment Plant

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
1. Pre-Construction stage						
None						
2. Construction stage						
2.1. Control of surface water quality	Siltation, garbage, oil and other visible pollutants	• Nam Tien, Nam Sao springs within the Protection Management Zone	Observation/ Interview	Weekly or after heavy rain or when complaints are received from communities	Contractor	Included in the contract
2.2. Minimization of dust generation	• Dust level	In the closest residential areas to material transport route; construction sites	Observation/ Interview	Monthly orin response to community's complaint	Contractor	Included in the Contract
2.3. Minimization of noise generation	• Noise level	In the areas nearby the construction sites	Observation/ Interview	Monthly orin response to community's complaint	contractor	Included in the Contract
2.4. Ensure Traffic safety	Number of vehicular accidents and reason	Along the material route especially along residential and institutional	Observation	Weekly orin response to community's complaint	Contractor Local road administr	Included in the Contract

		areas			ation units	
2.5Solid waste management	Composition and volume of solid waste	Worker's camp, construction area, dump site	Observation Interview	Weekly or in response to community's complaint	Contractor	Included in the Contract
2.6. Implement occupational health and safety measures	• Number of construction related accidents • Number of sick construction staff	Construction site; Along the material transport route near residential and/or institutional areas.	Observation and Interview	Weekly or in response to community's complaint	Contractor	Included in the Contract
2.7. Verification of licenses and legitimacy of construction material sources and quarries	The licences and other environmental documents	Construction Material sources, quarries	Verification	Once before construction time	Contractor	Included in the Contract
3. Operation stage						
3.1. Protection of the water source	• Presence of water pollutive activities within and near the Protection Management Zone • Water quality parameters from raw water to processed water as prescribed in government environmental quality standards(A_1standard QCVN08-2008/BTNMT)	• Within and around the Protection Management Zone • At the discharge point of the WTP	• Observation /Interview • Water sampling and laboratory analysis	• Monthly • Weekly	Lai Chau Water Supply Joint – Stock Company	Operations budget
3.2. Management of the WTP water treatment efficiency	• Clean water quality following the government standard QCVN 01:2009/BYT	At the WTP	Water sampling and laboratory analysis	Weekly	Lai Chau Water Supply Joint – Stock Company	Opearations budget

Table 5.b The environmental impact monitoring plan for Distribution and service system

Mitigation Measure	Parameters	Locations	Methods	Frequency	Responsibility	Cost
1. Pre-Construction stage						
None						
2. Construction stage						

2.1. Preventation of construction related damage to local social infrastructures	Number of days disruption of affected utilities	Pipeline segments where affected social infrastructures are located	Observation Interview	Monthly orin response to community's complaint	Contractor	Included in the Contract
2.2. Minimization of disturbance to local people/businesses	Number of Complaints filed and resolved	Residential and institutional areas crossed by pipelines	Observation Interview	Monthly orin response to community's complaint	Contractor	Included in the Contract
2.3. Minimization of dust generation	• Dust level	In the closest residential areas to material transport route; construction sites	Observation Interview	Monthly orin response to community's complaint	Contractor	Included in the Contract
2.4. Minimization of noise generation	• Noise level	In the areas nearby the construction sites	Observation Interview	Monthly or in response to community's complaint	contractor	Included in the Contract
2.5 Control of solid waste generated during construction process	Composition and volume of solid waste	Worker's camp, and construction site	Observation Interview	Weekly or in response to community's complaint	Contractor	Included in the Contract
2.6. Implemention of occupational health and safety measures	• Number of construction related accidents • Number of sick construction staff	construction sites; Along the material transport route near residential and/or institutional areas.	Observation and Interview	Weekly or in response to community's com`plaint	Contractor	Included in the Contract
2.7. Personel Management	Number of complaints filed and resolved	Workers' Camp	Observation Interview	Monthly orin response to community's complaint	Contractor	Included in the Contract
3. Operation stage						
3.1Management of water distribution system	• Volume of clean water distributed; • Reports of water leakage from pipelines and resolved.	Whole pipeline network	Record Observation Interview	Once every 6 months	Lai Chau Water Supply Joint – Stock Company	Opearation budget

2. Environmental compliance monitoring

10. The environmental compliance monitoring is carried out to check the compliance with the operating procedures, technical standards and/or contractor specifications in the EMP.

Table 6.a.Monitoring plan for Environmental compliance for Intake Pipeline andWater treatment Plant

Mitigation measure	Parameters	Location	Method	Frequency	Responsibility	Cost
1. Pre-Construction stage						
2. Construction stage						
2.1. Control of surface water quality	**a) Siltation:** + Construction of intake pipeline and WTPdone as much as practicable during dry days; + Maximize the use of excess excavation materials as much as possible; + Excess excavation and other construction waste materials are removed as soon as practicable, b)**Pollution due to waste water and petroleum products:** +Hazardous materials are properly stored in secured place away from drainage canal; + Construction equipment and vehicles are regularly maintained following the manufacturer's manual; +Cleaning and maintenance of construction equipment and vehicles done in secured place outside of Nam Tien, Nam Sao springs and drainage canal. +Solid waste are temporarily stored in non-water logged areas away from drainage canal and Nam Tien, Nam Sao springs	At the Intake pipeline,tank site, adjacent drainage canal and Nam Tien, Nam Sao springs at intake point	Observation Interview	Weekly or after heavy rain events or when complaints are received from communities	CSC	Included in the Contract
2.2. Minimization of dust generation	+All construction trucks transporting materials and waste are covered; +All construction vehicles and equipment are regularly maintained in good working condition; +Regular watering of unpavedsection of WTP construction area	In the closest residential areas to construction sites and material route	Observation Interview	Monthly or when receive the complant from community	CSC	Included in the Contract
2.3. Minimization of noise generation	+All construction vehicles and equipment are regularly maintained in good working condition following manufacturer's	In the closest residential areas to constructi	Observation Interview	Monthly or when receive the complant from	CSC	Included in the Contract

Mitigation measure	Parameters	Location	Method	Frequency	Responsibility	Cost
	manual; +Construction activities limited to regular working hours; +Local residents are informed of construction schedules thru information materials posted at CPC bulletinboards, loud speakers or letters.	on sitesand material route		community		
2.4. Ensure Traffic safety	+Safety measures (i.e. warning signs, fencing and lighting of construction area) installed; +Drivers of construction vehicles oriented to observe speed limits (15 kph) +Local residents are informed of construction schedules thru information materials posted at CPC bulletin boards, loud speakers or letters.	Along the material transport route	Observation Interview	Weekly orwhen receipt of complant from community	CSC	Included in the Contract
2.5. Implement waste management	+Solid waste are promptly collected, properly storedin temporary areas and transported to designated dumping sites; +Hazardouswaste properly stored in sealed containers at secured placeand regularly collected by DONRE acredited companies; +Domestic waste from field office stored in waste collection bins and regularly brought to designated disposal sites.	Field office, Constructi on sites	Observation Interview	Monthly or when receiptof complaint from community	CSC	Included in the Contract
2.6. Proper Management of personnel most especially migrant workers	+House-rules developed for construction personnel +Orientation held for construction workers on relationship with local population, health and sanitation; and prevention of communicable diseases, HIV/AIDS.	Worker's Accomod ations	Observation and Interview	Monthly	CSC	Included in the Contract
2.7. Verification of construction material source environmental licenses	The licenses and other environmental documents of construction material suppliers are verified to be legitimate and updated.	Material quarries	Document Verification	Once before construction time	CSC	Included in the Contract
3. Operation phase						
3.1. Protection of the Nam Tien, Nam Sao springs	+ Within and aroung theProtection Management Zone, no major construction, digging of toilet or garbage pits, waste dumping, nor anylivestock raising	Within the protection managem ent zone	Observation/ Interview	Monthly	Sin Ho DPC	Local budget

Mitigation measure	Parameters	Location	Method	Frequency	Responsibility	Cost
	activities are permitted to take place. + Public awareness of sanitation among the local community have been conducted thru public meetings, loud speakers, information materials posted in the CPC bulletin board. + Clear administrative measures and local regulations have been installed and enforced in orderto help protect the water source and and maintain sanitation within the area. + The water quality of the WTP effluent are within the prescribed standards (A_1 standard of QCVN08-2008/BTNMT[1])		Water sampling and laboratory analysis	Weekly		
3.3. Management of water quality after the treatment process	Clean water quality following the standard QCVN 01:2009/BYT[2]	At the WTP	Water Sampling, laboratory analysis	Once every 6 months	Lai Chau Water Supply Joint –Stock Company	Operations budget

Table 6.b. Monitoring plan for Environmental compliance for Distribution and service system

Mitigation measure	Parameters	Location	Method	Frequency	Responsibility	Cost
1. Pre-Construction stage						
2. Construction stage						
2.1. Preventation of local infrastructure damages	+ The time for pipelaying and restoration of access to private properties have been minimized without sacrificing quality of work; + Sign boardsindicating the speed limit had been installed along the public road traversing at the residential areas	Rural roads, irrigation canal, electric and telecommunication poles	Observation/ Interview	Monthly orwhen receiptof complant from community	CSC	Included in the Contract
2.2. Minimization of disturbance to local people/businesses	+Local leaders and residents have been Informed of the construction activities and schedule in advance thru public meetings, loud speakers, and information materials in the CPC bulletin	Pipeline segments that cross through the residential areas	Observation/ Interview	Monthly or when receiptof complant from community	CSC	Included in the Contract

[1] QCVN 08-2008/BTNMT- National technical regulation on surface water quality is used to define the limitation of surface water criteria for different purposes. A_1 standard is a set of standards to manage the surface water sources that are used to supply water for domestic purposes

[2] QCVN 01/2009 – National technical regulation on drinking water quality

Mitigation measure	Parameters	Location	Method	Frequency	Responsibility	Cost
	board; + The length of time to do pipelaying works for every segment were minimized without sacrificing the quality of work. + Excess excavation materials were regularly removed, temporarily stored in suitable areas, transported and deposited in approve disposal site,					
2.3. Minimization of dust generation	+All cargo of construction trucks transporting materials and waste are covered; + Drivers of construction vehicles and trucks observed speed limits (15 km/h) most especially when passing residential and institutional areas;	In the closest residential and institutional areas along the pipeline network and material route	Observation Interview	Monthly or when receive the complant from community	CSC	Included in the Contract
2.4. Minimization of noise generation	+All construction vehicles and equipment are regularly maintained in good working condition following manufacturer's manual; +Construction activities are limited to regular working hours; +Local residents are informed of construction schedules through information materials posted at CPC bulletinboards, loud speakers or letters. + At the sections through residential areas, construction activities that make excessive noise such as excavation, compaction of backfilled trenches or unloading of construction material are not allowed to be done during resting times such as the afternoonnap and evening (after 21h);	In the closest residential and institutional areas along the pipeline network and material route	Observation Interview	Monthly or when receipt of complant from community	CSC	Included in the Contract
2.5. Ensure Traffic safety	+Local residents are informed of construction schedules through information materials posted at CPC bulletin boards, loud speakers or letters. + Traffic aides are provided by local authorities to assist motorists and pedestrians pass through road segments with pipelaying activities.	Along the pipeline alignment	Observation Interview	Weekly orwhen receipt of complaint from community	CSC	Included in the Contract
2.6. Implement waste management at construction area and Field Office	+Solid waste are promptly collected, properly storedin temporary areas and transported to designated dumping sites; +Domestic waste from field office are temporarily stored in waste collection bins and regularly brought to designated disposal sites.	Field Office, Construction sites	Observation Interview	Monthly or when receipt of complaint from community	CSC	Included in the Contract

Mitigation measure	Parameters	Location	Method	Frequency	Responsibility	Cost
2.7Implementation of Occupational Health and Safety measures	+ Safety officers have been designated to enforce health and safety measures in the work place, and are trained on their additional task including first aid; + Contractors informed commune PC and local residents about construction time and traffic-related safety risks in order to raise their awareness and vigilance. + Safety equipment are provided to workers like gloves, helmets, raincoats, etc. Functional agencies check and supervise works on labor safety of workers at site and residents within the construction area;	Construction area,	Observation/ Interview	Monthly	CSC	Included in the Contract
2.8. Proper Management of personnel most especially migrant workers	+House-rules developed for construction personnel +Orientation held for migrantworkers on how to communicate with local population, personal hygeneand sanitation; and prevention of communicable diseases, HIV/AIDS.	Worker's Accomodations	Observation and Interview	Monthly	CSC	Included in the Contract
2.9. Verification of construction material source environmental licenses	The licenses and other environmental documents of construction material suppliers are legitimate and updated.	Construction Materials Suppliers' Office	Document Verification	Once before construction time	CSC	Included in the Contract
3. Operation phase						
3.1 Operations and Maintenance Work	+ Regular and periodic maintenance work are conducted following standard procedures for distribution systems; + Personnel are provided with suitable equipment and training on their (equipment) use to ensure proper upkeep of the distribution sytem; + Damagedsectionsof thepipeline network are promptlyrepaired and/orreplaced. + Water system service subscribers are oriented on water conservation, the use and upkeep of their respective faucets, and to report any leaks they see on the piping network, or any sudden weak water pressure to the water service management company for their immediate repair of the broken facility.	Whole pipeline network	Record Observation Interview	Once every 6 months	Lai Chau Water Supply Joint – Stock Company	Opearation budget

C. Assign task in EMP implementation

Table 7. EMP implementation

Organization	Roles and responsibilities		
	Subproject preparation	Subproject implementation	Subproject operation
CPMU	- Guide Safeguard consultantsduring the preparation of IEE report. - Review and provide comments on IEE submitted by Safeguard consultants.	- Guidance to PPMU safeguards officer on implementation of EMP during construction period. - Monitoring progress during construction time. - Prepare 6 month monitoring report and submit to ADB and DONREs/DPCs for review.	- Guidance to PPMU safeguards officer on implementation of EMP in the first operation year. - Monitoring progress in the first operation year. - Prepare Semi-annual Project environmental compliance report based on progress reports submitted by PPMU.
PPC	Not applicable	The Project owner with supreme responsibility for environmental activities of sub-project during construction.	The project employer is responsible for environmental activities in the operation stage, including implementation of EMP during operation stage.
PPMU	- Assist safeguard consultants hired by CPMU to prepare IEE, - Ensuring PPMU staff are well trained in environmental management.	- Responsiblefor EMP implementation during pre-construction and construction stages; - Ensure that details of contracts and bidding invitation documents include environmental requirements; - Implement inspection and monitoring of environmental issues during construction stage; - Coordinate with CPMU on environmental monitoring report preparations.	- Responsiblefor EMP implementation during first year of operation; - Undertake investigation and monitoring of environmental issues during first years of operation; - Support the project employer to incorporatethe environmental requirements into O&M procedures.
DPC	Integrate recommendations and contributions of DONRE in EMP	Monitor EMP implementation through their own internal monitoring system	Establish a water supply company which has responsibility on monitoring EMP through their own internal monitoring system
Commune Supervision Board and local community	- Involved in consultation and participatein the identification and preparation of sub-	- Involve in environmental monitoring activities as directed; - Participate in findingsolutionstoenvironmental problems if any.	Involve in environmental monitoring activities as directed.

Organization	Roles and responsibilities		
	Subproject preparation	Subproject implementation	Subproject operation
members (CSBs [3])	project feasibility study; - Contribute ideas on environmental assessment document once they receive it.		
Contractor	Not applicable	- PrepareSiteEMP acceptable to Project owner to meet subproject EMP general requirements ; - Allocate sufficient resources to meet the requirements and obligations in site EMP. - Prepare monthly progress report in their EMP implementation, and whenever directed by the PPMU.	Not applicable
CSC	Not applicable	- Ensure CSC staff are well trained in environmental monitoring; - Carry out the EMP monitoring depending on construction progress as stated in contract with PPMU. - Prepare regular Monitoring reports and submit them to the PPMU.	Not applicable

D. Monitoring and reporting system

Table 8.Monitoring and reporting system

Project Phase	Type of Report	Frequency	Responsibility	Submitted to Whom
Construction	**Site Environmental Performance Report** indicating the compliance with the Site EMP and monitoring results	Monthly	CSC	PPMU
	EMP Compliance Report indicating compliance with subproject EMP and monitoring results. The report will include: (i) main impacts during the construction; (ii) proposed mitigation measures; (iii) assess operation effect of the subproject environmental management system; (iv) proposals and suggestions on the system operation, mitigation of environmental impacts in next construction periods	Monthly	CSC	PPMU
	EMP Implementation Report indicating the compliance with the subproject EMP and monitoring results	Semi-annually or twice during construction depending on construction duration	PPMU/CPMU	ADB/DONRE/DPC

[3] CSBs, established under Decree 80/2005/QD-TTg Regulation for Participatory investment supervision, dated on 18/04/2005. Article 8 of Decree 80 provides the community with opportunities to inspect the compliance, monitor implementation and evaluate results of investments in commune, including environmental impacts.

	Subproject Environmental Report indicating the overall subproject environmental performance and EMP compliance	At completion of subproject	CPMU	ADB/DONRE/DPC
Operation	EMP OperationReport: monitoring requirements as provided for under Ministry of Health QCVN 01:2009/BYT (National Technical Regulation on Drinking Water)., Section III (Frequency of Water Qualtiy Monitoring)	Semi-annually for first 5years of operation.	PPMU	CPMU/ADB

E. Budget for EMP Implementation

Table 9.Budget for EMP Implementation

Items	Pre-Construction	Construction stage	Operation stage	Total
Implementation of approved Resettlement Plan		The Contractor takes responsibility (in case of arising affects)	None	Various
Environmental monitoring	n/a	Included in the Contract with Contractor and CSC as well as in PPMU's management cost	Local and provincial budget	Included in contracts or other operation capital sources
Community monitoring	n/a	Local commune budget	Local commune budget	Local commune budget
Training on capacity enhancement on environmental monitoring capability	n/a	Included in CPMU training cost **Total: 10,000,000VND(**(detail in Appendix 1, table 13)	n/a	
Public disclosure	Defined in consultancy contract	The Contractor takes responsibility (part of contract)	n/a	
Community consultation	As stated in the consultant contract	In the implementation cost of CSC	Not applicable	Included in contract among investor, stakeholders and other sources of capital

V. PUBLIC CONSULTATION AND DISCLOSURE ACTIVITIES

A. Description of activities to date

Table 10. Community consultation and public disclosure

Consultation method	Details of activities	
Correspondences and meetings with local authorities (District and Commune PCs, Commune Fatherland Front, Women's Union, Youth's Union and others)	Date of correspondence	The PPMU contacts by telephones and reaches agreement on the working time.
	Date of meetings	11 November, 2014
	Minutes of meeting attached (Yes/ No)	Yes
Notification on paper/radio/other mass media	Date(s) of notification	11 November, 2014
	Notification	The Commune PC inform affected households
Public meeting	Date(s) of meeting	
	Location(s) of meeting	CPC meeting hall
	Invitees	CPC officials, village leaders, beneficiaries and affected households in subproject affected areas
	Methods of invitation	The PPMU send correspondences to the communes, where notice is delivered through loud speakers and village heads are convened, who shall disclose the information to residents.
	Agenda to be attached (Yes/ No)	Yes/No
	Minutes of meeting to be attached (Yes/ No)	Yes /No
	Number of participants	There are 22 persons in Pa Tam commune to participate the public meeting. In which, 5 particitants is male and 17 ara female.

B. Outcomes of public consultation to date

Table 11. Outcomes of public consultation

Description of issue to be raised	By Whom?	Reference in IEE	Required follow-up Actions?
The status of water use of people; water source; estimated cost; sensorial quality of people	People in the commune	Changing the access to clean stable and standable water source	The Contractor should consider when designing and getting locals's opinions on the status and their need before making final designs
The distribution network will run along the village/ inter-communal roads: Affect on the irrigation	People in the commune	Morphological changes on the irrigation	It needs a reasonable construction plan for the distribution network. Avoid as much as possible affecting drainage works, other natural water sources
It is recommended to provide the employment for local residents during the construction.	People in the commune	Benefits from the employment or livelihood for the local labor force	Make the most employment of local human resources to create jobs and incomes for local people while reduce negative effects from imigrant workers.

Description of issue to be raised	By Whom?	Reference in IEE	Required follow-up Actions?
Pileline installation may damage the assets of local people	People in the commune	This is noted in the mitigation measure for the constructor	It needs to monitor the constructor by local people and disclose the Grievance redress mechanism

C. Future public consultation activities

Table 12. Expected community consultation activities

Activity	Participants	Expected outcomes	Schedule	Cost estimate
Kick-off meeting prior to the construction commencement	PPMU, Contractor, CSC, community representatives in subproject area.	- Inform all stakeholders of construction activities and schedule. - Agreement on detailed mitigation measures.	1 week prior to the construction commencement	Be estimated in the EMP budget
Periodical meetings	Contractor, Construction Supervision Consultant, local authorities, mass organizations and the public in the project area.	- Periodically check the effectiveness of planned mitigation measures and any arising problems - Propose alternative measures and reach agreement on implementation	Once every month from the construction commencement	Included in the contract with the parties

VI. GRIEVANCE REDRESS MECHANISM

The CPMU has developed a grievance redress and resolution mechanism for environment to address grievances and complaints related to EMP implementation in a timely and satisfactory manner for the on-going similar projects (Figure 3).

Every attempt should be made to establish a rapport between the affected communities and the implementing agencies through frequent interactions and transparency thereby maximizing the resolution of grievances at commune level. A three-stage procedure for redress of grievances is proposed based on practice as follows:

(i) **Stage 1:** Complaints from affected people on any environmental damage caused by the project implementation will be lodged verbally or in written form by the affected people (refer to Appendix 8 for sample complaint form). The staff from commune/Commune Supervision Board will assess the level of environmental damage and report to the PPMU within 15 days of the complaint is received.

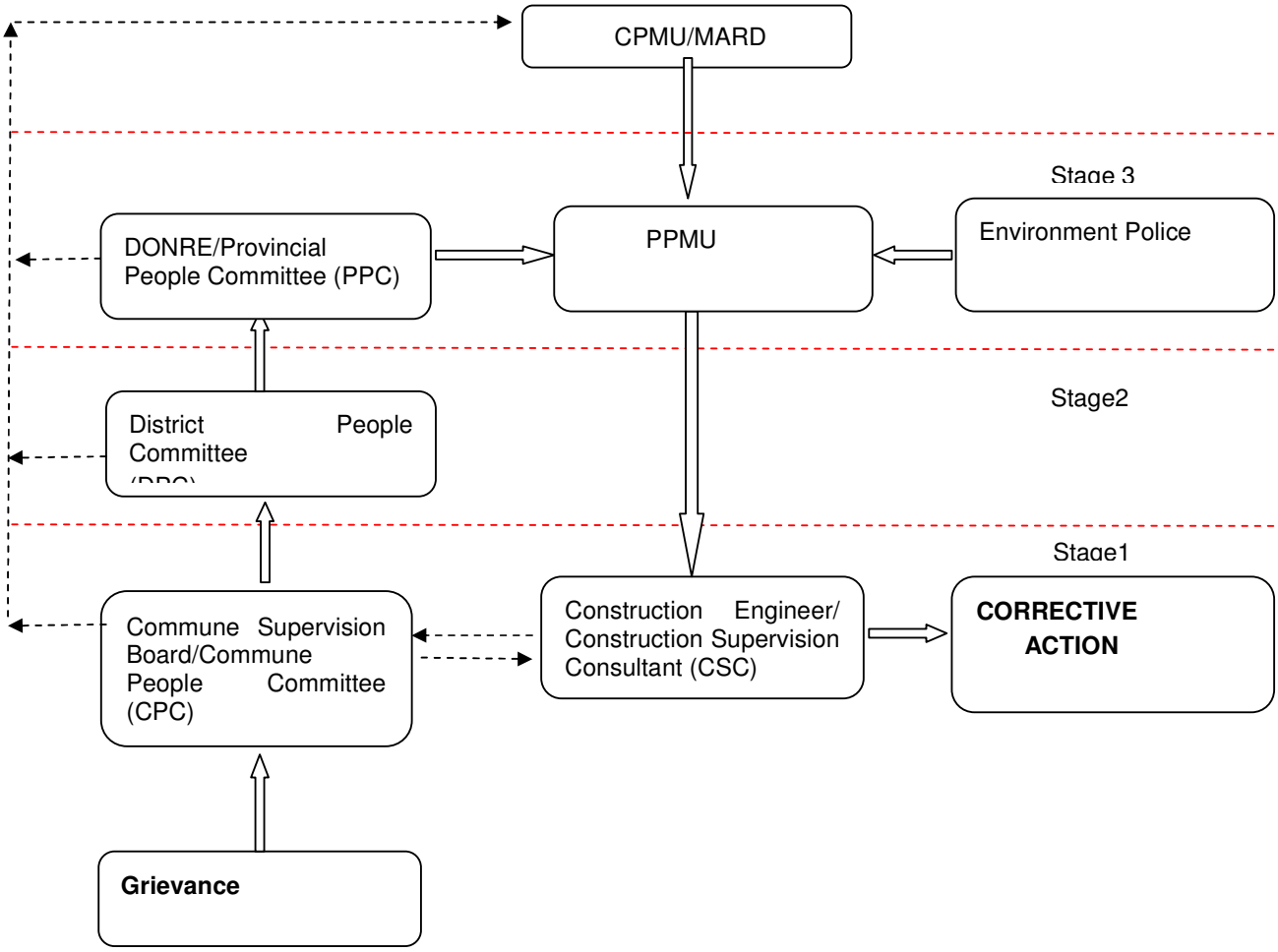
(ii) **Stage 2:** If no resolution can be reached or if no response is received from the liaison officer within 15 days of registering the complaint, the affected people can take their complaint to the District People Committee who will conduct a site investigation to assess the damage and discuss with a contractor during the construction stage to determine and immediately take the appropriate remedial measures within 30 days of the complaint is received.

(iii) **Stage 3:** If the affected people are not satisfied with the decision of District People Committee or in the absence of any response, the affected people can appeal to the DONRE or Provincial People's Committee (PPC). The DONRE/PPC will provide a decision on the appeal within 45 days but not exceeding 60 days[4], from the day it is received by the PPC. In this stage, DONRE/PPC will enforce PPMU to take the strong corrective action to resolve the problems either though enforcement of contractor's duties under the signed contract or providing necessary additional actions under its overall duties of project implementation.

[4] Law on Complaints, Article 28, Law No. 02/2011/QH13 dated November 11, 2011

A complaint or a case to the Court of Law may be done separately or independently from the Project level Grievance Redress mechanism filing process. Implementers of the mechanism should be guided by appropriate government decrees related to complaints such as: Law on Complaints No. 02/2011/QH13; Article 64 of Government Decree 84/2007/ND-CP; Clause 2, Article 40 of Decree 69/2009; and regulation on grievance at Government Decree 75/2012/ND-CP dated 20/11/2012.

Figure 5: Grievance redress mechanism



VII. CONCLUSIONS AND RECOMMENDATIONS

11. The "Improvement of domestic water supply in Pa Tan commune, Sin Ho district"." will be implementedby PPMU Lai Chaufor the Sustainable Rural Infrastructure Development Project In the Northern Mountain Provinces, in Sin Hodistrict, Lai Chau Province.

12. The sub-project environment assessment has been implemented and its potential environmental impacts are mainly found in various subproject stages.

13. Main potential environmental impacts of the subproject in the preconstruction stage:

The construction of the facility will result in the loss of 530m^2land which will be used to build the water intake and Water Treatment stations.A resettlement due diligent report had been prepared intended to mitigate the social impact the subproject implementation may create.

The installation of the pipelines will also temporarily affect idle lands belonging mostly to CPC as a result of digging trenches for laying the pipes, but these areas will be backfilled and restored to their pre-subproject condition.

14. Main potential environmental impacts of the subproject in the construction stage:

(i) Increase risk in vehicle related accident due to the additional number of units using the public road with the introduction of construction truckstransportating construction materials and waste;

(ii) Increaseair pollution due toadditional exhaust gases, dust, noise, and vibrations generated by the operations of construction equipment andvehicles; which can potentially affects the health of local people and construction workers who may may be exposed to these contaminants for extended periods;

(iii) Generation of additional solid waste, and domestic waste water as a result of the construction works and operations of the worker's camp;

(iv) Impacts on the project area due to the presence of immigrant workers, resulting to conflicts and social evils as theft, drugs, and prostitution.

15. Main potential environmental impacts of the subproject in the operation stage

(i) During the operation, the water supply system will producelimited quantities of waste water from cleaning of the WTP facilities. These quanlities is so small

16. Mitigation measures and monitoring methods are developed for the subproject, including the following activities:

Construction stage

(i) Material transport

- Limit the speed of trucks transporting materialsthrough residential and institutional areas;
- The Contractor, in meetings with commune authorities and local residents, should inform people about the construction schedule and possible traffic safety risks, to makepeople understand and aware;
- Minimize the transportation of materials in rainy seasons;

(ii) Construction sites

- Provide safety equipment for workers like helmets, raincoats, gloves, etc., and train them how to use the equipment. The competent bodies should monitor regularly to ensure the safety for workers and residents in the construction sites;
- Assign safety officers and train them on their task including orientation of first aid;restrict the entry of local residentsinto the workplace by putting warning signs at strategic places and install fences around the construction area; and inform residents about possible risks during the construction through the commune officials, public regular meetings; loud speakers, and/or posting of information materials at the CPC bulletin board;
- Orient migrant workers on how to communicate with local people, proper personal hygene and sanitation, and the prevention of infectious diseases prevention of social evils like illegal drug use, gambling, prostitution, violence, and theft.

Operation stage:

For Intake works, Pipelines andWater Treatment Stations

(i) Within Nam Tien, Nam Sao springs Protection Management Zone,no construction, digging of pits for open toilet and garbage, waste dumping and live stock raisingactivities are to be permitted.

(ii) Orient the local water supply service subscribers onwater conservation and existing laws on the use of natural resources, among the local community in order to inform them to complywith the regulations of water exploitation and water use, wastes discharge, animal raising, use of pesticides and fertilizers;

(iii) The local authoritiesto issue clear administrative measures and regulations in order to strictly enforcewater conservation, responsible use of resources, and protection of the water resource.

(iv) Regularly collect, dry and properly dispse of the WTP sludge to the designated disposal sites once every three month by a contract with anEnvironment and Sanitation Company or related government licensed company.

(v) Regular monitoring of the water quality at the intake and discharge points at the WTPs to determine compliance by the facility to local environmental water effluent standards. If the existing facility fails to comply with regulations, then additional water treatment for the waste water needs to be designed and installed to treat cleaning water prior to discharge to the receiving water Nam Tien, Nam Sao springs.

(vi) Carry out reasonable operation measures to prevent noise impact to the surrounding of the subproject;

For distribution and service pipeline

(vii) Monitor the conditions of the pipeline, note any damage or leakages along the pipeline, and promptly repair the damage areas. Local people are to be encouraged to report any sign of leakages to the WTP management unit.

Monitoring methods:

(i) The construction contractors must take measures and commit to the implementation of mitigation measures. At the same time,the contractors must prepare detailed plans for their environmental monitoring and allocation of sufficient resources to meet the general requirements and the mandatory provisions of the environmental monitoring plan (EMP) on the field;

During the operation stage, the entity assigned by the Project Owner (Sin Ho People Committee) should manage the operations and maintenance of the facility, which includes

+ Monitoring the condition of the Nam Tien, Nam Sao springs Protection Management Zone, and promptly call the attention of people that are doing activities adjacent to the zone, and seek the assistance of the local authorities specifically to prohibited the unauthorized activities within the water source.

+ Monitorthe water quality of the raw water and final treated water quality following the A1 standard of QCVN08-2008/BTNMT and QCVN 01:2009/BYT respectively;

(ii) The PPMU should strengthen the supervision on the Contractors' compliance with the environmental provisions and in collaboration with local levels to implementthe environmental management plan.

17. Conclusions and recommendations

Based on the findings of the environmental assessment and EMP set out in this report, the following conclusions can be made:

(i) The Sub-project is Environment Category B;

(ii) The Sub-project is not located in Environmentally sensitive area;

(iii) The IEE Report fully identifiedand assessall significant impacts during the three phases: Pre-construction, Construction and operation phases. Likewise, the Consultant also present mitigation measures which had been relyed thru consultation with the local authorites and affected households;

(iv) An Environmental management plan (EMP) has been developedfor implementation of the concerned parties to mitigate the identified adverse negative impact the construction and operation of the proposed Subproject will create. Also, an Environmental Monitoring Plan had been deviced so that reports generated by assigned monitors will help Decision makers keep track of EMP Implementation progress and effectivity;

(v) Mitigation measures in the EMP will be incorporated as an integral part of the construction bidding documents. The contractor will review the task prescribed in the EMPand give the total cost for these mitigation measures. This cost will be known as the Environmental and safety costs, and these costs will be paid when the mitigation measures committed have been effectivelyimplementedby the Contractor.

(vi) Recommended external environmental monitoring tasks (as described in IEE) of the construction supervision consultant will be incorporated into the construction supervision consultancy contract.

(vii) There is no further environmental study needed, and that this IEER be approved by the MARD and ADB, which will form the basis for the pursuit of the next step.

APPENDIX

Appendix 1: The cost estimation for the EMP implementation

Environment Management Capacity Building

Training Courses	Trainees	Number of trainees	Cost rate (VND)	Source of cost
Preparation of Site Environmental Management Plan	Project Manager/ Environmental Officer of Contractor	2 persons/ contractor	2persons x 500,000 VND/person = 1,000,000VND	Included in the contract between contractor and the stakeholders
Environmental monitoring	PPMU Safeguard Staff, CSC Environment Staff, Contractor Environment Staff	6persons include:2persons fromPPMU 2 persons from CSC and 2 from Contractor	500,000 VND/person x 6person = 3,000,000VND	Included in the contract between contractor and the stakeholders
Environmental monitoring for Community Supervision Board	CSB Staff	2persons / commune x 1communes = 2persons	2persons x 500,000 VND/person =1,000,000 VND	Included in the contract between contractor and the stakeholders
Environmental Monitoring for Water Supply Company	Staff ofwater supply company	4 persons	4persons x 500,000 VND/person = 2,000,000VND	Include in the contract agreement between the DONRE Lai Chau PPC and Lai Chau Water Supply Joint – Stock Company
Total (VND)			7,000.000	

The cost for public consultation meetings

Local authorities and community representatives who are likely to be affected by the project will be informed with subproject construction plans, environmental impacts and their mitigation measures as well as Environmental Management System that will be applied to this subproject.

The cost for the public consultation will comprise: (I) cost for holding one meeting in Pa Tan commune (ii) cost for documents, photos supporting public disclosure. Total cost for this item will be: VND 2000,000 .

Total EMP Cost Estimate

Content	Cost (VND)
Cost for capability building and training	**7,000,000**
Cost for public disclosure	**2,000,000**
Total	9,000,000.

Appendix 2: Photographs of Subproject Site

	
Confluence of source stream Nam Sao Intake site some 2 km above the confluence. As advised by officials rice terraces are not irrigated from the stream. Flow in stream measured in 2013/14 dry season as 60 liters/sec	Confluence of source stream Nam Sao Intake site some 2 km above the confluence. As advised by officials rice terraces are not irrigated from the stream. Flow in stream measured in 2013/14 dry season as 60 liters/sec
	
Numerous privately owned small bore plastic pipes	Numerous privately owned small diameterplastic pipes

Appendix 3: Content of consultation meetings

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
CENTRAL PROJECT MANAGEMENT UNIT

Sustainable Rural Development Project in the Northern Mountain Provinces
(ADB Loans 2682/2683-VIE)

DOCUMENTATION OF PUBLIC CONSULTATION

I. SUBPROJECT:
Improvement of domestic water supply in Pa Tan commune, Sin Ho district

II. DATE, TIME, AND VENUE / LOCATION
Date 11 November, 2014, in Pa Tan commune, Sin Ho district, Lai Chau Province.

III. ATTENDANCE: By Gender

Communes	Total Attendance	
	Male	Female
Pa Tan	5	17

IV. PROGRAM:

Topic / Activity	Responsible Person / Entity
Introduction participants of the commune, and objectives the consultation meeting	A representative of the Commune People's Committee
Presentation the Subproject background and objectives, reasons for consultation, and the composition of consultants	Representatives of the Provincial Project Management Unit
Presentation detailed specifications of the subprojects: WTP, intake, pipeline length	Project designer
Presentation ADB resettlement policies, the policy framework of the Government of Vietnam, provincial policies and the policy framework of subprojects: the conditions of eligibility for compensation and resettlement assistance if state revenues land.	Safeguard consultants
Consultation on: the compensation and resettlement plan for the subproject, replacement cost, measures to support relocation and resettlement required by the subproject;the project implementation plan;the environmental impacts and mitigation measures.	Safeguard consultants
Consultation on the grievances and grievances redress.	Safeguard consultants
Consultation on issues related to gender.	Safeguard consultants

V.ISSUES AND CONCERNS

Matrix of issues and concerns

Nº	Issue Raised		Response on Issue Raised	
	Issue	Who Raised the Issue/ Suggestion	Response	Person / Sector Who Responded to the Issue/ Suggestion
1	We quite agree the implementation of the subproject. There should be an announcement ahead to AHs before any implementation of the site clearing works.	Lo Van Khoan, Pa Tan commune	- Yes, the subproject has a mechanism of disclosure of information and the people are encouraged participate in any work of the subproject. Notice will also be given to APs on when site clearing is to be conducted.	Safeguard consultant
2	Are there any policies to support poor people affected by the subproject?	Lo Thi Thi, Pa Tan commune	Yes, of course. For this subproject, vulnerable persons, such as poor one will get some assistance by this subproject	

Nº	Issue Raised		Response on Issue Raised	
	Issue	Who Raised the Issue/ Suggestion	Response	Person / Sector Who Responded to the Issue/ Suggestion
			following the policies reconciled between ADB's ones and Vietnam Government's ones.	
3	The existing Water sourcesare not enough for daily domestic use and quality of water is not good We are look forward for the planned water supply facility.	Sin Van Vanh, Pa Tan commune	- We try our best to implement the subproject as soon as possible to meet the requirement of people	- PPMU - Safeguard consultant
4	How can we be assured that the subproject facilities can be servicable for a long period of time?	Dinh Van Thanh, Pa Tan commune	The construction contractor will be provided with instructions and detailedtechnical specifications on the construction of the subproject facilities and can be monitored by the community during the construction and operations and maintenance phase. And contractor will be obliged to implement appropriate methods of construction, hire competent workers and use sound management measures to ensure public order and safety for residents.	Safeguard consultant
5	- We know that the subproject is necessary. The treated water in the planned WS SP is needed in oder to improve health condition for all people. - In the implementation period, increase in noises, dust, smoke, may be produced. What will the subproject do to minimize these impacts?	Sinh Thi Van, Pa Tan commune	- The contractor will take measures to minimize the environmental pollution during the construction as: the whenever practicable, reuse of excavated soil, and proper disposal of excess spoils, avoid flooding, dust control measures enforced druing land clearing/excavation works; proper scheduling of construction activities to avoid works during strong rains; reduce water pollution, proper maintenance of construction equipment and vehicles; proper upkeep of construction camp or yards, etc.	Safeguard consultant
6	We have any chance to work as employees during construction process.	Lo Thi Nga, Pa Tan commune	Yes, of course. We will require contractors to employ local workers to some extent.	Safeguard consultant

Appendix 4. Minutes of the Public Consultation meeting

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

-------***------

....., Ngày....., tháng....., năm 201.....

Dự án phát triển cơ sở hạ tầng nông thôn bền vững các tỉnh miền núi phía Bắc

BIÊN BẢN THAM VẤN CỘNG ĐỒNG

Về các chính sách: Môi trường, Tái định cư, Giới và Dân tộc thiểu số

Tiểu dự án:.....

.....

Địa điểm:.....xã Pa Tần, huyện Sìn Hồ.....

I. **Thành phần tham dự:**

- Ông/Bà:.....Vũ Văn Hưng..... Chức vụ:.....Phó phòng BQLDA Sở NN
- Ông/Bà:.....Sìn Văn Xáng..... Chức vụ:.....Bí thư đảng ủy xã Pa Tần
- Ông/Bà:.....Trần Trần Hưng..... Chức vụ:.....BQLDA Sở nông nghiệp
- Ông/Bà:.....Vũ Quốc Duy..... Chức vụ:.....PBI tư vấn thuật kê
- Ông/Bà:.....Đào Thanh Thái..... Chức vụ:.....Chuyên gia tái định cư
- Ông/Bà:..... Chức vụ:.....
- Ông/Bà:..... Chức vụ:.....
- Ông/Bà:..... Chức vụ:.....

- Đại diện những người bị ảnh hưởng:.....người (*chi tiết xem danh sách đính kèm*)

II Nội dung tham vấn:

1. Cán bộ BQLDA tỉnh giới thiệu về địa điểm, quy mô, các thông số kỹ thuật cơ bản và những tác động Tiểu dự án được xây dựng ở địa phương mang lại.

2. Cán bộ tư vấn trình bày về Khung chính sách của Dự án về giới và sự tham gia của cộng đồng trong quá trình thực hiện dự án, những vấn đề về phong tục, tập quán của cộng đồng dân tộc thiểu số, các kế hoạch phát triển người dân tộc thiểu số; những tác động môi trường tiềm năng của dự án bao gồm tác động lên môi trường tự nhiên và xã hội của khu vực dự án và những biện pháp giảm thiểu các tác động tiêu cực; những tác động khi thu hồi đất và các tài sản trên đất. Đồng thời, chuyên gia cung cấp thông tin liên quan đến các chính sách của Chính

phủ Việt Nam, nhà tài trợ ADB và Dự án đối với những nhóm đối tượng dễ bị tổn thương, phụ nữ và các nhóm dân tộc thiểu số trong quá trình thực hiện Tiểu dự án và trong vấn đề môi trường, bồi thường thiệt hại khi Nhà nước thu hồi đất đai và các tài sản trên đất.

III. Ý kiến thảo luận:

1. Các vấn đề về môi trường:

Dự án không có tác động tiêu cực đáng kể đối với các vấn đề môi trường. Đối với công tác thi công có nhiều tác động tiêu cực như bụi, tiếng ồn, An toàn giao thông. Những vấn đề về trên nó các đơn vị thi công giải quyết các tác động trên

2. Các vấn đề về tái định cư: thu hồi đất và các tài sản trên đất, đền bù, giải phóng mặt bằng, hỗ trợ các hộ bị gián đoạn kinh doanh hay ảnh hưởng sinh kế,...

Qua trình thu hồi đất không có nhiều ảnh hưởng vì tôi đồng hay mùa màu của các hộ dân không có hộ nào bị thu hồi đất quá 10% diện tích đất của gia đình

3. Các vấn đề về giới, cộng đồng và dân tộc thiểu số

Dự án đi qua khu vực đồng bào dân tộc thiểu số, thuỷ nhiều không ảnh hưởng tới người dân
Tất cả người dân đều ủng hộ dự án cấp nước cho các hộ dân

IV. Kết luận

Dự án không có các tác động tiêu cực đối với môi trường
Dự án không ảnh hưởng tới các vấn đề về quyền lợi của người dân tại địa phương
Tất cả các hộ dân đều ủng hộ dự án và mong muốn công trình sớm thi công để cung cấp nước sinh hoạt cho người dân

Cuộc họp các bên thống nhất và kết thúc vào lúc:.....giờ.....ngày.....tháng.....năm 201.....

Đại diện BQLDA tỉnh	Đại diện cộng đồng	Đại diện UBND xã
GIÁM ĐỐC		Tân Văn Oanh
Đại diện các tổ chức xã hội	**Cán bộ tham vấn**	**Xác nhận của đơn vị tư vấn**
	Đỗ Thanh Hải	

Appendix 5: Analysis of Water Source Samples Laboratory Test Results and Proposed Treatement Method Incorporated in Subproject Design

No.	Analytical Parameters	Unit	Laboratory Test Results of Raw Water Samples		MOH Standard	SP Water Treatment Method
			Scheme 1	Scheme 2		
1	Color	TCU	3	1	15.0	None
2	Turbidity	NTU	1	3	2.0	Filtration and Sedimentation
3	Cl^{--}	Mg/l	46.7	36.7		
4	pH	-	6.7	7.26	6.5-8.5	None
5	Ammonia	mg/l	0.03	0.02	3.0	None
6	Total Fe	mg/l	0.01	0.05		
7	Hardness (as $CaCO_3$)	mg/l	125	74.8	300	None
8	Florua	mg/l	0.02	0.01	3.0	None
9	Arsenic	mg/l	0	0	0.01	None
10	Total Coliform	MPN/100 ml	36	36	0.0	None
11	E. Coli	MPN/100 ml	3	0	0.0	None

The laboratory test results for raw water samples taken from the three SP water supply schemes shows conformity to most of the analytial parameters in the Ministry of Health Standards (QCVN 02, 2009/BYT) that were used.However, there is a critical parameters were the results had indicated exceedances (E.Coli level). However, no chlorination which will sanitize the raw water from pathogenic bacteria that may be present. Technical design consultant have been requested to implement a type of chlorination into the design of WS. Photocopies of the raw water samples laboratory test results are found in the subsequent pages.

SỞ NÔNG NGHIỆP & PTNT TỈNH LAI CHÂU
TRUNG TÂM NƯỚC SẠCH & VSMT

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 26 /TTN - PXN

Lai Châu ngày 1 tháng 10 năm 2014

PHIẾU KIỂM NGHIỆM NƯỚC

1. Địa chỉ lấy mẫu: Nguồn 1: Cải tạo CTCNSH xã Pa Tần - Huyện Sìn Hồ
2. Người lấy mẫu: Phan Văn Phúc Ngày lấy mẫu: 24/9/2014
3. Người nhận mẫu: Trương Thanh Long Ngày nhận mẫu: 24/9/2014
4. Người Phân tích mẫu: Trương Thanh Long Ngày phân tích 25/9/2014
5. Loại mẫu: Chưa qua xử lý Tình trang mẫu: Đựng trong 1 chai 1,5 L
6. Kết quả :

TT	Chỉ tiêu	Đơn vị	Giới hạn tối đa cho phép (TT số : 05/2009/TT- BYT ngày 17/6/2009)	Kết quả	Nhận xét
1	Màu sắc	TCU	15	1	Đạt
2	Mùi, vị	-	Không có mùi vị lạ	Không	Đạt
3	Độ đục	NTU	5	3	Đạt
4	Clo dư	mg/l	Trong khoảng 0,3-0,5		
5	pH	-	Trong khoảng 6,0-8,5	7,26	Đạt
6	Hàm lượng Amoni	mg/l	3	0,02	Đạt
7	Hàm lượng sắt tổng số	mg/l	0,5	0,05	Đạt
8	Độ Oxi Hóa (Chất hữu cơ)	mg/l	4	0,65	Đạt
9	Độ cứng tính theo (CaCO3)	mg/l	350	74,8	Đạt
10	Hàm lượng Clorua	mg/l	300	36,7	Đạt
11	Hàm lượng florua	mg/l	1,5	0,01	Đạt
12	Hàm lượng Asen tổng số	mg/l	0,01	0	Đạt
13	Colifom tổng số	Vi khuẩn/100ml	50	36	Đạt
14	E. Coli hoặc Colifom chịu nhiệt	Vi khuẩn/100ml	0	0	Đạt

Nhận xét: Mẫu nước trên đạt chỉ tiêu.

Ghi chú: *Kết quả trên chỉ có giá trị trên mẫu thử*

Ngày 1 tháng 10 năm 2014

Cán bộ xét nghiệm
(Ký, ghi rõ họ tên)

Trương Thanh Long

Giám đốc

TRUNG TÂM NƯỚC SẠCH VÀ VỆ SINH MÔI TRƯỜNG

Nguyễn Ngọc Miến

SỞ NÔNG NGHIỆP & PTNT TỈNH LAI CHÂU
TRUNG TÂM NƯỚC SẠCH & VSMT

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 28 /TTN - PXN

Lai Châu ngày 1 tháng 10 năm 2014

PHIẾU KIỂM NGHIỆM NƯỚC

1. Địa chỉ lấy mẫu: Ngầu 2 - Đầu mối số 1: Cải tạo CT CNSH xã Pa Tần huyện Sìn Hồ
2. Người lấy mẫu: Phan Văn Phú Ngày lấy mẫu: 24/9/2014
3. Người nhận mẫu: Trương Thanh Long Ngày nhận mẫu: 24/9/2014
4. Người Phân tích mẫu: Trương Thanh Long Ngày Phân tích: 25/9/2014
5. Loại mẫu: Chưa qua xử lý Tình trang mẫu: đựng trong 1 chai 1,5 l
6. Kết quả :

TT	Chỉ tiêu	Đơn vị	Giới hạn tối đa cho phép (TT số : 05/2009/TT- BYT ngày 17/6/2009)	Kết quả	Nhận xét
1	Màu sắc	TCU	15	3	Đạt
2	Mùi, vị	-	Không có mùi vị lạ	không	Đạt
3	Độ đục	NTU	5	1	Đạt
4	Clo dư	mg/l	Trong khoảng 0,3-0,5		
5	pH	-	Trong khoảng 6,0-8,5	6,7	Đạt
6	Hàm lượng Amoni	mg/l	3	0,03	Đạt
7	Hàm lượng sắt tổng số	mg/l	0,5	0,01	Đạt
8	Độ Oxi Hóa (Chất hữu cơ)	mg/l	4	1,26	Đạt
9	Độ cứng tính theo (CaCO3)	mg/l	350	125	Đạt
10	Hàm lượng Clorua	mg/l	300	46,7	Đạt
11	Hàm lượng florua	mg/l	1,5	0,02	Đạt
12	Hàm lượng Asen tổng số	mg/l	0,01	0	Đạt
13	Colifom tổng số	Vi khuẩn/100ml	50	36	Đạt
14	E. Coli hoặc Colifom chịu nhiệt	Vi khuẩn/100ml	0	3	Không đạt

Nhận xét:
Mẫu nước trên không đạt chỉ tiêu về mặt phương diện vi sinh (E.Coli lớn 3 vượt quá tiêu chuẩn cho phép)

Ghi chú: *Kết quả trên chỉ có giá trị trên mẫu thử*

Ngày 1 tháng 10 năm 2014

Cán bộ xét nghiệm
(Ký, ghi rõ họ tên)

Trương Thanh Long

Giám đốc

TRUNG TÂM NƯỚC SẠCH VÀ VỆ SINH MÔI TRƯỜNG

Nguyễn Ngọc Miến

APPENDIX 6. SAMPLE COMPLAINT FORM

Sample: 32 (issued together with Decision No. 1131/2008/QĐ-TTCP dated 18.06.2008 of the General inspector)

Socialist republic of Vietnam

Independence – Freedom – Happiness

.....,date....month.....Year...

COMPLAINT

Address to:.....(1)

Full name:.....(2); Code of document.....(3)

Address:.....

Complaint.....(4)

Content of complaint.....(5)

.....

(Documents, evidences attached if any)

The complainant

(sighnature&write the full name)

(1) names of agencies, organizations and individuals competent to settle complaints

(2) Full name of complainnant,

- If a representative for the agency, organization, title name agencies they represent.

- Authorized if the complaint shall specify on the authorization of agencies, organizations and individuals.

(3) This content is recorded by complaint resolved agency.

(4) Complaint for the first time (second time) with whose decision/ action?

(5) Content of complaint

- Brief description about the situation;

- Request (suggest) of the complainant (if any);

Appendix 7. The National Technical Regulations on Drinking Water Quality of the Ministry of Health (QCVN 01: BYT/2009 issued on June 17, 2009)

TT	Criteria	Unit	Limitation	Analysis method	Monitoring level
I. Observationalandinorganiccomponents					
1.	Colour(*)	TCU	15	TCVN 6185 – 1996(ISO 7887 - 1985) or SMEWW 2120	A
2.	Taste(*)	-	Odorless, tasteless	Sense, or SMEWW 2150 B và 2160 B	A
3.	Turbidity(*)	NTU	2	TCVN 6184 – 1996(ISO 7027 - 1990)or SMEWW 2130 B	A
4.	pH(*)	-	Trong khoảng 6,5-8,5	TCVN 6492:1999 or SMEWW 4500 - H^+	A
5.	Hardness (as $CaCO_3$(*))	mg/l	300	TCVN 6224 - 1996 or SMEWW 2340 C	A
6.	(TDS) (*)	mg/l	1000	SMEWW 2540 C	B
7.	Al(*)	mg/l	0,2	TCVN 6657 : 2000 (ISO 12020 :1997)	B
8.	Amoni(*)	mg/l	3	SMEWW 4500 - NH_3 C or SMEWW 4500 - NH_3 D	B
9.	Antimon	mg/l	0,005	US EPA 200.7	C
10.	Asen	mg/l	0,01	TCVN 6626:2000 or SMEWW 3500 - As B	B
11.	Bari	mg/l	0,7	US EPA 200.7	C
12.	Bo (consists of Borat and Axit boric)	mg/l	0,3	TCVN 6635: 2000 (ISO 9390: 1990) or SMEWW 3500 B	C
13.	Cadimi	mg/l	0,003	TCVN6197 – 1996(ISO 5961 - 1994) or SMEWW 3500 Cd	C
14.	Clorua(*)	mg/l	250 300(**)	TCVN6194 – 1996(ISO 9297 - 1989) or SMEWW 4500 - Cl^- D	A
15.	Total Crom	mg/l	0,05	TCVN 6222 – 1996(ISO 9174 - 1990) or SMEWW 3500 - Cr^-	C
16.	Total Cu (*)	mg/l	1	TCVN 6193 - 1996 (ISO 8288 - 1986) or SMEWW 3500 - Cu	C
17.	Xianua	mg/l	0,07	TCVN 6181 – 1996(ISO 6703/1 - 1984) or SMEWW 4500 - CN^-	C
18.	Florua	mg/l	1,5	TCVN 6195 – 1996(ISO10359 - 1 - 1992) or SMEWW 4500 - F^-	B
19.	Hydro sunfur(*)	mg/l	0,05	SMEWW 4500 - S^{2-}	B
20.	Total Fe (Fe^{2+} + Fe^{3+})(*)	mg/l	0,3	TCVN 6177 - 1996 (ISO 6332 - 1988) or SMEWW 3500 - Fe	A
21.	Pb	mg/l	0,01	TCVN 6193 - 1996 (ISO 8286 - 1986) SMEWW 3500 - Pb A	B
22.	Total Mangan	mg/l	0,3	TCVN 6002 - 1995 (ISO 6333 - 1986)	A
23.	Total Hg	mg/l	0,001	TCVN 5991 - 1995 (ISO 5666/1-1983 - ISO 5666/3 -1983)	B
24.	Molybden	mg/l	0,07	US EPA 200.7	C
25.	Niken	mg/l	0,02	TCVN 6180 -1996 (ISO8288 - 1986)SMEWW 3500 - Ni	C
26.	Nitrat	mg/l	50	TCVN 6180 – 1996(ISO 7890 - 1988)	A
27.	Nitrit	mg/l	3	TCVN 6178 - 1996 (ISO 6777-1984)	A
28.	Selen	mg/l	0,01	TCVN 6183-1996 (ISO 9964-1-	C

				1993)	
29.	Natri	mg/l	200	TCVN 6196 - 1996 (ISO 9964/1 - 1993)	B
30.	Sunphát (*)	mg/l	250	TCVN 6200 – 1996(ISO9280 - 1990)	A
31.	Zn(*)	mg/l	3	TCVN 6193 - 1996 (ISO8288 - 1989)	C
32.	Pecmanganat criteria	mg/l	2	TCVN 6186:1996 or ISO 8467:1993 (E)	A
II. Organiccomponents					
a. Alkane chlorination group					
33.	Cacbontetraclorua	µg/l	2	US EPA 524.2	C
34.	Diclorometan	µg/l	20	US EPA 524.2	C
35.	1,2 Dicloroetan	µg/l	30	US EPA 524.2	C
36.	1,1,1 - Tricloroetan	µg/l	2000	US EPA 524.2	C
37.	Vinyl clorua	µg/l	5	US EPA 524.2	C
38.	1,2 Dicloroeten	µg/l	50	US EPA 524.2	C
39.	Tricloroeten	µg/l	70	US EPA 524.2	C
40.	Tetracloroeten	µg/l	40	US EPA 524.2	C
b. Hydrocacbua Arome					
41.	Phenol và dẫn xuất của Phenol	µg/l	1	SMEWW 6420 B	B
42.	Benzen	µg/l	10	US EPA 524.2	B
43.	Toluen	µg/l	700	US EPA 524.2	C
44.	Xylen	µg/l	500	US EPA 524.2	C
45.	Etylbenzen	µg/l	300	US EPA 524.2	C
46.	Styren	µg/l	20	US EPA 524.2	C
47.	Benzo(a)pyren	µg/l	0,7	US EPA 524.2	B
c. Benzen clorination group					
48.	Monoclorobenzen	µg/l	300	US EPA 524.2	B
49.	1,2 - Diclorobenzen	µg/l	1000	US EPA 524.2	C
50.	1,4 - Diclorobenzen	µg/l	300	US EPA 524.2	C
51.	Triclorobenzen	µg/l	20	US EPA 524.2	C
d. Complex organic group					
52.	Di (2 - etylhexyl) adipate	µg/l	80	US EPA 525.2	C
53.	Di (2 - etylhexyl) phtalat	µg/l	8	US EPA 525.2	C
54.	Acrylamide	µg/l	0,5	US EPA 8032A	C
55.	Epiclohydrin	µg/l	0,4	US EPA 8260A	C
56.	Hexacloro butadien	µg/l	0,6	US EPA 524.2	C
III. Chemical plant protection					
57.	Alachlor	µg/l	20	US EPA 525.2	C
58.	Aldicarb	µg/l	10	US EPA 531.2	C
59.	Aldrin/Dieldrin	µg/l	0,03	US EPA 525.2	C
60.	Atrazine	µg/l	2	US EPA 525.2	C
61.	Bentazone	µg/l	30	US EPA 515.4	C
62.	Carbofuran	µg/l	5	US EPA 531.2	C
63.	Clodane	µg/l	0,2	US EPA 525.2	C
64.	Clorotoluron	µg/l	30	US EPA 525.2	C
65.	DDT	µg/l	2	SMEWW 6410B, or SMEWW 6630 C	C
66.	1,2 - Dibromo - 3 Cloropropan	µg/l	1	US EPA 524.2	C
67.	2,4 - D	µg/l	30	US EPA 515.4	C
68.	1,2 - Dicloropropan	µg/l	20	US EPA 524.2	C
69.	1,3 - Dichloropropen	µg/l	20	US EPA 524.2	C

70.	Heptaclo và heptaclo epoxit	µg/l	0,03	SMEWW 6440C	C
71.	Hexaclorobenzen	µg/l	1	US EPA 8270 - D	C
72.	Isoproturon	µg/l	9	US EPA 525.2	C
73.	Lindane	µg/l	2	US EPA 8270 - D	C
74.	MCPA	µg/l	2	US EPA 555	C
75.	Methoxychlor	µg/l	20	US EPA 525.2	C
76.	Methachlor	µg/l	10	US EPA 524.2	C
77.	Molinate	µg/l	6	US EPA 525.2	C
78.	Pendimetalin	µg/l	20	US EPA 507, US EPA 8091	C
79.	Pentaclorophenol	µg/l	9	US EPA 525.2	C
80.	Permethrin	µg/l	20	US EPA 1699	C
81.	Propanil	µg/l	20	US EPA 532	C
82.	Simazine	µg/l	20	US EPA 525.2	C
83.	Trifuralin	µg/l	20	US EPA 525.2	C
84.	2,4 DB	µg/l	90	US EPA 515.4	C
85.	Dichloprop	µg/l	100	US EPA 515.4	C
86.	Fenoprop	µg/l	9	US EPA 515.4	C
87.	Mecoprop	µg/l	10	US EPA 555	C
88.	2,4,5 - T	µg/l	9	US EPA 555	C
IV. Chemical disinfectantsandbyproducts					
89.	Monocloramin	µg/l	3	SMEWW 4500 - Cl G	B
90.	Clo dư	mg/l	Trong khoảng 0,3 - 0,5	SMEWW 4500Cl or US EPA 300.1	A
91.	Bromat	µg/l	25	US EPA 300.1	C
92.	Clorit	µg/l	200	SMEWW 4500 Cl or US EPA 300.1	C
93.	2,4,6 Triclorophenol	µg/l	200	SMEWW 6200 or US EPA 8270 - D	C
94.	Focmaldehyt	µg/l	900	SMEWW 6252 or US EPA 556	C
95.	Bromofoc	µg/l	100	SMEWW 6200 or US EPA 524.2	C
96.	Dibromoclorometan	µg/l	100	SMEWW 6200 or US EPA 524.2	C
97.	Bromodiclorometan	µg/l	60	SMEWW 6200 or US EPA 524.2	C
98.	Clorofoc	µg/l	200	SMEWW 6200	C
99.	Axit dicloroaxetic	µg/l	50	SMEWW 6251 or US EPA 552.2	C
100.	Axit tricloroaxetic	µg/l	100	SMEWW 6251 or US EPA 552.2	C
101.	Cloral hydrat (tricloroaxetaldehyt)	µg/l	10	SMEWW 6252 or US EPA 8260 - B	C
102.	Dicloroaxetonitril	µg/l	90	SMEWW 6251 or US EPA 551.1	C
103.	Dibromoaxetonitril	µg/l	100	SMEWW 6251 or US EPA 551.1	C
104.	Tricloroaxetonitril	µg/l	1	SMEWW 6251 or US EPA 551.1	C
105.	Xyano clorit (tính theo CN^-)	µg/l	70	SMEWW 4500J	C
V. Radiation level					
106.	Tổng hoạt độ α	pCi/l	3	SMEWW 7110 B	B
107.	Tổng hoạt độ β	pCi/l	30	SMEWW 7110 B	B
VI. Microorganism					
108.	Total Coliform	VBarterier/ 100ml	0	TCVN 6187 - 1,2 :1996(ISO 9308 - 1,2 - 1990) or SMEWW 9222	A
109.	E.coli	Barterier/1 00ml	0	TCVN6187 - 1,2 : 1996(ISO 9308 - 1,2 - 1990) or SMEWW 9222	A

Appendix 8. References

(i) Feasibility study report on The Sustainable Rural Infrastructure Development Project in Northern Mountainous Provinces, 2014

(ii) The Safeguard Policy Statement of the Asian Development Bank, 6/2009

(iii) Statistical Yearbook of Lai Chau Province in 2013

(iv) Report on the subproject investment.

(v) Project description.

(vi) Report on primary design.

(vii) Report on socioeconomic summary of the subproject communes

(viii) Report of the Women Union of the subproject communes

(ix) Report of Farmers' Association of the subproject communes

(x) Report of the Youth Union of the subproject communes