HOA BINH PROVINCIAL PEOPLE'S COMMITTEE

DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

VIETNAM DAM REHABILITATION AND SAFETY PROJECT
(WB8)

REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

Sub-project:

Rehabilitation and improvement for Safety of Dai Thang Reservoir

HANOI, MAY 2015

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DAM REHABILITATION AND SAFETY IMPROVEMENT PROJECT

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

Sub-project: Rehabilitation and improvement for Safety of Dai Thang Reservoir

ON BEHALF OF EMPLOYER **ON BEHALF OF CONSULTANT**

HANOI, MAY 2015

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SUMMARY

The ESIA report of the rehabilitation and upgrading Dai Thang reservoirheadworks presents positive and negative impacts on environment and society. It includes 8 main parts as followings:

1. ***Description of the background of Dai Thang Reservoirheadworks:***

Dai Thang Resrvoir is located in Duc Binh village, An Binh commune, Lac Thuy district, Hoa Binh province. It was built in 1960 from a branch of Cho Dap stream which is flowed to Hoang Long River. With a working area of 1.6km^2, total capacity of 483,000 m^3, Dai Thang Reservoir supplies irrigative water for 100 ha of paddy rice, 30 ha of farm produce as well as depletes groundwater for 200 households surrounding. The work items of Dai Thang headwork system consist of:

- ***Dam:*** It is a homogeneous earth dam with the size L x B x H = 200m x 3m x 17.9m. Downstream face of the dam has many termite nests (about 50 – 60 nests when monitoring) and it is covered with wild grass and weeds. Dam body had 5 laterals cracks and 1 longitudinal crack (with a size from 1 to 2 cm).
- ***Water intake:***It is located in the body of dam with reinforced concrete structure, discharge of 0.15m^3/s, length of 100m and diameter of 400mm.
- ***Spillway:*** It is anearthspillway with the size of L x B = 40m x 20m. It is located about 150 from left abutment of the dam and no energy dissipation basin.
- ***Channel system:*** Channel system was reconsolidated in 2008. The system has total length of 5 km, size of B x H = 0.5m x 0.5m or 0.3m x 0.3m and structure of the motar stone having the strength of#100.

Due to long time use, the construction has seriously degraded.Currently, the headwork system of Dai Thang Reservoir is highly becoming deteriorated. Reservoir is deposited, resulting in 10 – 15% capacity reduction; dam face is carved by waves with some palates (depth of 30 – 40 cm; downstream face is eroded by rain, creating troughs (D = 20 – 30 cm, B = 10 – 20 cm); water intake is facing with permeable phenomenon and there is no energy dissipation basin after water intake; overflow spillway is a vertical drop with many deep troughs.

2. The main purposes of the sub-project:

(i) Ensure the safety of the reservoir during operation and exploitation process, adapting to climate change and meeting the increasing demands for water of people in the downstream area, mitigating the negative impacts on the environment, landscape of reservoir foundation and downstream;

(ii) Ensure original design goals of supplying water forirrigation of 100ha of paddy rice, 30ha of farm produce for 3 villages (Duc Binh, Dai Thang, Thang Loi) in An Binh commune, Lac Thuy district (iii) Ensure the safety of human and human's properties of downstream people in the rainy season (iv) Encourage small scale aquaculture in Dai Thang Reservoir.

The subproject "Rehabilitation and Improvement for Safety of Dai Thang Reservoir, Hoa Binh Province" had been proposed for investing and funding by the World Bank, under Dam Rehabilitation and Safety Project (DSRIP)

3. Sub-project description:

Implementation of sub-project consists of: rehabilitation of headwork dam, strengthening of weir, rebuild manaagement house, termite treatment and installation of monitoring system. Sub-project is designed and implemented based on framework of

environment-social management plan (ESMP) and framework of dam safety program from World Bank to follow strictly administrative regulations as well as standard of Vietnamese government. Impacts during the preparation and construction process are fully assessed, managed and monitored by submiting detail plans and periodly report to management board

4. Affecteded zone/area of sub-project

- If the dam is broken, administrative zones of An Binh commune, schools, medical centers, post offices, etc… will be influenced. In more details, about 6km of concrete and asphalt road; electrical wire system, 5 km of channel system, 130ha of farmland and 400 households with a population of 1600 habitants will be influenced, in which:

- The affected household will be compensated and supported sufficiently complying with resettlement policy framework (RPF). The details are stated in project's RAP report. In total there are 12 households will be affected in terms of land loss as follow:

+ As calculated, aproximately 15,935 m^2 and 4,438 m^2 will be lost permanently and temperarily respectively.

+ In which 7 households will loss permanently in agricultural land with the area of 12,413 m^2; 2 households will loss permanently in agricultural land with the area of 1,718 m^2 và in forestry land having the area of 500 m^2; 1 household will loss permanently in the residential land with the area of 500 m^2 and in agricultural land with the area of 803.2 m^2; 3 households will be lost temperarily in agricultural land with the area of with the area of 3.604 m^2; Especially 1 household will lost a house with a area of 60 m^2.
+ Annual crops will be lost: 12,578 m^2 of paddy rice 3,840 m^2 of maize; 920 m^2 of groundnut and 822 m^2 of sugar cane. Forestry trees lost: 130 Acacia trees at the ages from 3-5 years old.
+ 244 households will be influenced when the water cut off during the period of the water intake repairation in which the minority people (Muong) takes 223 households; The area of 571,297 m^2 of the paddy rice will be encountered the water shortage within 2 to 6 months in which the area belongs to the Muong people takes 535,711 m^2 .

5. Environmental-social impacts during implementation of sub-project:

- ***Preparation stage:***preparation of plant, tents and material collection impacts to environment and society. In this stage,land appropriate from forestry (about 25.000 m^2 for quarry, dumping site, borrow) and agriculture (about 5.00m^2 for tents, material collection site) affects forestry cover level and income of influenced households. 15,935 m^2 of the residential, agricultural and forestry land of 12 households in Duc Binh village are considered to be impacted. Other impacts such as waste generation (2.5kg solid waste/day), wastewater (0.48m^3/day) dust and exhaust fume are temporary impacts and only affect in the short time (01 months of preparation stage).
- ***Construction stage:*** Influenced sources are spillway, water intake strengthenning and rebuild of management house. Positive impacts can be predicted as increase of the capicity of the spillway, improvement of infrastructure for headwork system and enhancement of irrigation for agriculture activities for the An Binh commune; create job

opportunities for local people and encouragement of goods consumption. On the other hand, with a maximum number of 52 workers/day (deviding by 2 shifts), about 2.5 m^3/day of wastewater and 13kg solid waste/day will be generated. The influences of waste generation in this stage are insignificant. Transportation of construction materials requires 157 turns/day with a volume of 230,441 tons. Due to dust generating, the influenced radius is 700m during 20km of transportation distance.

- ***Operational stage:*** The effectiveness for irrigation in agriculture of Dai Thang reservoir depends on operation process. Since management house is rebuilt therefore infrastructure, appurtenant works (i.e. toilet, drainage system, water supply system) will not be affected at the first years of operation. There are insignificant waste generating from operational stage. However, the problematics of white ants inside the dam body can influence to environment, for instance, reduce the strengthening of the dam, cause flood to downstream people when having heavy rain, discharge in reservoir will be higher designed value and finally, water can permeate through the body of dam.....

6. Environmental and social impacts and mitigation measures

- Disminish the impacts to water and soil environment: water supply in safety, collect and treat wastewater effectively. Daily waste collection should be applied to manage solid waste.
- Disminish the impacts to air environment: Cover trucks/vehicles with canvas on theway from material shop to headwork system. By using good quality of fuel, the impacts to air environment could be reduced. atering during the preparation of plant, materials for implementation of sub-project.
- Diminish the impacts to human health and life: implement the construction works in day time to reduce the influence of noise to local people. Educate workers' attitude to excavate natural resource in plan and to live in local community. Using local labor on implementation of sub-project to increase income for poor people and reduce cultural confliction.

7. Plan to manage and mitigate impacts during project implementation process: To minimize potential adverse impacts during project implementation period, the following measures need to be done adequately under the close, uninterrupted and open consultancy with local authority and community:

(i) Make sure that the environmental protection criteria will be stated in contract's terms of project and make clear with the contractors.

(ii) Implementing mitigation measures adequately with the observation and modification suitably to actual conditions to achieve the highest minimization.

(iii) Supervising and monitoring closely the implementation of safety measures to ensure the mitigation measures should be sufficient and effectively implemented during project's implementation.

(iv) Planning and performing completely the stakeholder consultation during project's preparation and implementation.

8. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is: VND **35,537,760,462**

- In which Budget for ESMP implementation : VND **458,700,000**
- Budget for ESMoP implementation: VND **237,603,000**

9. Public consultation and disclosure

In this report, the activities relevant to public consultation will be also mentioned to assess acceptable level and feedback from local people during implementation. Public consultation activities are mainly focused on affected area (Duc Binh, Thang Loi, Dai Thang, Dai Dong). Consulted people are the leaders of community, affected people (selected from 4 villages). The results, all of them positively support for sub-project "Rehabilitation and safety improvement of Dai Thang Reservoir"

10 This ESIA report includes:

Part 1: Project introduction

Part 2: Sub-project description

Part 3: Policy framework, institution and regulations.

Part 4: Existing environmental and social baseline of sub-project area

Part 5: Environmental and social impacts assessment

Part 6: Analysis of Alternatives of sub-project

Part 7. Environmental -social management plan and environmental-social monitoring plan

Part 8. Public consultation and disclosure

PART I: INTRODUCTION

1.1. General information of the project

DRSIP is intended to improve the safety of the dams and related works, as well as the safety of people and socio-economic infrastructure of the downstream communities as defined in Decree 72 - governing the management of dam safety in Vietnam. The project will consist of the following components:

- Component 1: Dam safety rehabilitation (US$ 385 million)
- Component 2: Dam safety management and planning (US$ 60 million)
- Component 3: Project management support (US$15 million)
- Component 4: Disaster contingency (US$ 0 million - no fixed allocation, but not to exceed 20% of the total project cost)
- Implement agencies

- DRSIP will be implemented in 31 provinces in the North, Central and Highland regions. Up to 400 dams will be selected for consideration under the project with and will be based on an a priori agreed selection criteria aimed at prioritizing those interventions that address the risks within an explicit poverty and inequality framework**.**

- The "Rehabilitation and safety improvement of Dai Thang Reservoir" is one of the 12 sub-projects identified for first year implementation under the Dam Rehabilitation and Safety Improvement Project (DRSIP, WB8). The DRSIP is a World Bank-funded project in support to the Dam Safety Program of the Vietnam Government through the rehabilitation and safety upgrade of a number of priority dams and reservoirs. The main objective of the dam rehabilitation is to protect and infrastructure downstream of the dam while at the same time improving the long term viability and operational efficiency of the reservoir.

- This Environmental and Social Impact Assessment (ESIA) is carried out in compliance with the Vietnam's Law on Environmental Protection (LEP) and the World Bank's Environmental Assessment Policy (OP/BP 4.01).

1.2. Approaches and Methodologyfor ESIA implementation

1.2.1. Approaches and methodology for social assessment

The purpose of this social assessment (SA), conducted in an integral manner with environmental assessment for this subproject, is two-fold. First, it examined the potential impacts of the subproject – positive and adverse impact – on the basis of planned project activities. Second, its findings inform the design of measures addressing identified potential adverse impact and proposing community development activities that are relevant to the project development goal. For identified adverse impact that could not be avoided, consultation with local people, governmental agencies, project stakeholders, etc., were carried out to ensure affected peoples will be appropriately compensated for, and supported in a manner that their socio-economic activities will be promptly and fully restored to the pre-project level, at least, and that their livelihoods will not be worsen off, in the long run, as a result of the subproject.

As part of the social assessment, where ethnic minority (EM) peoples are present in the subproject area –as confirmed by the EM screening (as per Bank's OP 4.10), consultation with them were carried out in a free, prior, and informed manner, to confirm if there is broad community support from affected EM peoples for the subproject implementation. EM

screening was conducted as per Bank's OP 4.10, and was done the scope and coverage of the social assessment vis-à-vis the environmental assessment (OP 4.01). A gender analysis was also done as part of the SA to understand underlying gender dimensions (from project impact perspective) to enable gender mainstreaming to promote gender equality, and enhance further the development effectiveness of the subproject, and the project as a whole. Depending on the magnitude of the identified potential project impact, and the project development objective, a gender action plan and gender monitoring plan were prepared.

To ensure all potential impact could be identified during project preparation, the SA was conducted through series of consultations with various project stakeholders. A particular focus was maintained on households who are potentially affected (both positively and adversely). The research techniques employed for this SA include 1) review of secondary data, 2) field observations; 3) focus groups discussions/ community meetings, 4) key informant interview, and 5) households survey . A total of 102 respondents participated in the SA exercise for this subproject, of which 70 people participated in the household survey (quantitative), and 32 people participate in focus groups discussions, community meetings, key informant interview (qualitative).In-depth interviews and group discussions involve those from the survey sample and key personnel at provincial, district, commune levels. Each group has 6-8 people. (For the sampling method, see Annex B1)

Part 5 here of presents SA Findings (both in terms of positive and negative impacts), including the results of gender analysis. Part 4 here of summarizes SA Results and Related Recommendations. Please note that a gender action plan and gender monitoring plan are presented at Annex B4 of this ESIA) (Community Health Management Plans; Community Consultation and Communication Strategies; are detailed in Annexes B2, B3 respectively).

1.2.2. Approaches and Methodology for Environmental assessment

Methods using in this report are mentioned as bellows:

(1) Field survey and monitoring: survey and monitor environmental baseline, sampling and quick assessment on some environmental parameters to upgrade and supplement information of sub-project area. Consultancy Unit conducted 2 field surveys: 1st survey on February 4th, 2015 to February 12th, 2015 and 2nd survey on March 25th, 2015 to March 27th, 2015.

(2) Statistical method: Compile, analysis the data of meteorology, hydrograph and relevance socio-economic environment.

(3) Stakeholder consultation: Based on the meeting, contact to collect advice from specialists to propose alternatives of proposed project.

(4) Desk review: Synthesize, compile the impacts of sub-project on components of environment and society.

(5) Network method: build the network that expresses the causes and the effects due to many different activities (primary impacts, secondary impacts and higher order of impacts) of the sub-project.

(6) Environmental matrix method: assess environmental impacts, semi-quantify the impacts of implantation of sub-project.

(7) Modeling method: apply a model (Sutton model) to predict average concentration of pollutants affecting air, water.

(8) Rapid assessment method*:* Use the pollution factors of the World Health Organization (WHO) to estimate the amount of waste and pollution forecasting

1.3. Consultant agency

ESIA report for sub-project "Rehabilitation and improvement of headwork system for Dai thang reservoir" is written by Institute for Hydropower and Renewable Energy.

-Consultant agency: **Institute for Hydropower and Renewable Energy**

- Address: No 8, Gate 95 Chua Boc, Dong Da, Hanoi

- Tel/Fax: 043 8521298

List of experts working on ESIA report

No	Full name	Education	Mission
I	*Project Host*		
1	Tran Ngoc Minh	Engineer in Irrigation and Draninage	Head of the Division of the Agricultural and Rural Development Project Management
II	*Consultant Agency*		
1	Pham Thi Ngoc Lan	Doctoral of Environment	Team Leader–Works on Environmental Management Planning and on the Environmental Monitoring Plan
2	Bui Thi Thuy	Master of Environmental Engineering	EIA expert – works on Environmental Impact Assessment
3	Pham Thi Thuan	Environmental Engineer	Expert – works on Existing Environmental Practice and Capacity Assessment
4	Le Hung Anh	Doctoral of Ecology	Expert – works on Ecological Impact Assessment
5	Nguyen Hong Thuy	Doctoral of Society	Works on Social Impact Assessment
6	Le Thanh Ha	Master of Agricultural Economy	Works on Resettlement Action Planning
7	Nguyen Van Huan	Master of Chemistry	Analyzes water, soil and air quality

PART II: SUB-PROJECT DESCRIPTION

2.1. Overview of Sub-project

- Name of the Sub-project: **Rehabilitation and Safety Improvement of Dai Thang Reservoir**

Dai Thang Irrigation Reservoir is located in Duc Binh village, An Binh commune, Lac Thuy district of Hoa Binh province. The reservoir is 25 km toward SouthWest of Chi Ne district.The catchment area of the reservoir is of1,6 km2 ranked in the small scale and the its total capacity of 483.000 m^3.

- Objectives of the sub-project:
  - Ensuring the full operational functions of the irrigation reservoir
  - Ensures the safety of human and assets for downstream people, especially in rainy season.
  - Improving the existing ecological environment and aquatic cultures in the areas
- Project owner:

  Hoa Binh Department of Agricultural and Rural Development

  - Address: Squad 13, Dong Tien Ward, Hoa Binh town, Hoa Binh province.
  - Tel/Fax: 0218 3852003; 0218 3853789 .
- Total cost estimation:

The total estimated investment budget is*VND* **35,537,760,462**

(Thirty five billion, five hundred and thirty seven million, seven hundred and sisxty thousand Vietnamese Dong)

- Target Area: Dai Thang Resrvoir is located in Duc Binh village, An Binh commune, Lac Thuy district, Hoa Binh province (see in Figure 2-1 and Figure 2-2). It was built in 1960 from a brach of Cho Dap stream which is flowed to Hoang Long River. Dai Thang Reservoir supplies irrigation water for 100 ha of paddy rice, 30 ha of farm produce as well as creating the source for groundwater for 200 households surrounding during dry season.

Geography location of An Binh commune faces to:

- An Lac commune in the North
- Yen Dong commune and Ninh Binh Province in the East
- Ninh Binh province in the South
- Yen Thuy district in the West

Sub-project area belongs to midland and mountainous region with an average slope of 15^o, maximum slope of 40^o. Topography of this area is mainly mountainous with the height in the range of 120 to 270m compares to sea level. In general, the commune has some difficulties on access irrigation water, resulting in low yield of farming activities. Figure 2.1 to Figure 2.3 shows the location of sub-project for headwork system of Dai Thang Reservoir.

Figure 2-1: Location of headwork system of Dai Thang Reservoir

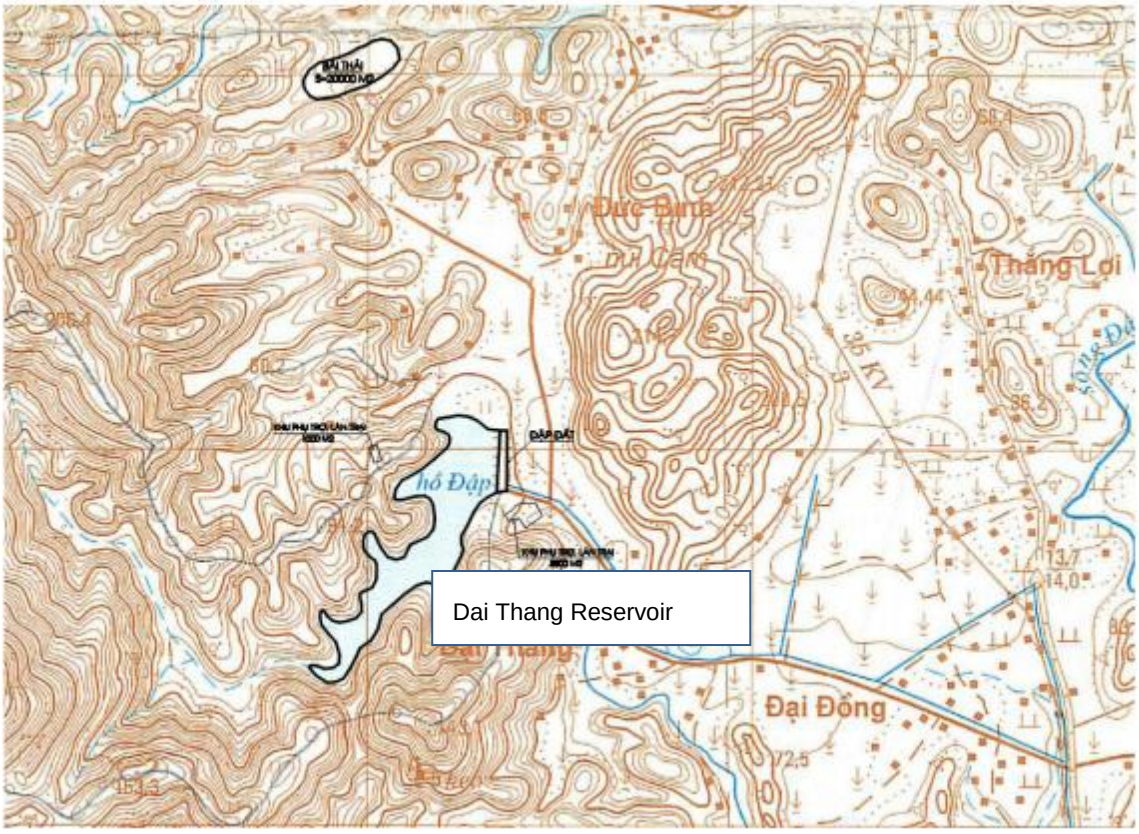

Figure 2-2: Layout of the construction site

2.2. The proposed scope of work

2.2.1. Existing work items status of Dai Thang Reservoir

Invested work items of Dai Thang Reservoir include:

-***Reservoir:***In this Sub-project, Reservoir is preserved.

-***Headwork dam***: Strengthen dam face, dam body; handle white ant and cracks on the body of dam.

- ***Water intake***: Extend water intake inside the body of dam

- ***Flood weir:*** Rehabilitate and strengthen weir structure.

- ***Management and operational house:*** Rebuild.

- ***Management road:*** Rehabilitate

Table 2-1: Work items of Dai Thang Reservoir

No	Items	Existing status	Rehabilitation
1	Reservoir	With a working area of 1.6km^2, total capacity of 483000 m^3, Dai Thang Reservoir supplies irrigation water for 100 ha of paddy rice, 30 ha of farm produce as well as depletes groundwater for 200 households surrounding and protects for 194 households at downstream area, ensures the safety of Reservoir.	Preserved
2	Dam	- Size: L x B x H = 196m x 3.5m x 17.9m - Including dam upstream face and dam downstream face. + Upstream face and downstream face are not reinforced and highly becoming deteriorated: carved by waves with some palates (depth of 30 – 40 cm; + Downstream face is eroded by rain, creating troughs (D = 20 – 30 cm, B = 10 – 20 cm); + Dam face has many white ant nests (about 50 –	- Extend crest breadth from 3.5m to 10m. - Strengthen crest structure by concrete of M200 with a thickness of 20cm; designed slope to downstream of i = 3%. - Upstream face: Protect upstream face by reinforced concrete plates of M200. - Downstream face:cover with reinforced concrete. - Set up rainwater drainage on the dam face. - Install monitoring system. - White ant removal inside the body of dam - Pull up the weed on dam face

No	Items	Existing status	Rehabilitation
		60 nests when monitoring) and it is covered with wild grass. + On dam face, there are 5 lateral cracks and 1 longitudinal crack with B = 1 – 2 cm.	
3	Weir	- Weir is built on the left shoulder of the dam at a distance of 200m. It has a structure of earth weir with a total length of L = 65m, breadth of B = 20 – 15m. - The inclined drop without energy dissipation ditch next to overflow weir is not reinforced. Water is directly discharged to the farm (i.e. Duc Binh village).	- Rehabilitate the weir in an accordance with inlet, overflow weir, inclined drop bottom, energy dissipation basin bottom by reinforced concrete M200; inclined drop wall, energy dissipation wall by rock M100. - Inlet of overflow weir: + Reinforce the bottom by concrete M200 with a thickness of 40cm. + Overflow weir: It has an elevation of +47.70m, B = 20.0m, L = 5m, reinforced concrete structure of M200 with a thickness of 40cm. - Inclined drop: + Structure ofinclined drop bottom is reinforced concrete of M300 with a thickness of 30cm. + Structure of cataract bottom is reinforced concrete of M200 with a thickness of 30cm. + Structure of energy dissipation yard is reinforced concrete of M200 with a thickness of 30cm. - Drainage channel next to cataract is made from stone of M100, size of 10 x 2.5m, a thickness of 30cm; channel face is reinforced by mortared stonework of M100 with a thickness of 30cm;
4	Water intake	Water intake is located inside the body of dam, structured as a circular intake with reinforced concrete and other parameters as followings: - Design discharge Q=0,15m3/s - Length: 84m - Diameter: D300 - There are 2 permeable phenomena at downstream	- Replace existing water intake by a new one with L = 96m, D = 400mm with a thickness of 6mm, cover with a reinforced concrete layer of M200 and a clay layer of 0.5m. - Inlet structure: Reinforced concrete of M200, size L x B xH = 3,2x1,2x1,3m. + Downstream of water intake: install a control valve D400, a needle valve is placed in the valve house (L x B

No	Items	Existing status	Rehabilitation
		of the water intake: longitudinal permeate and leaking to the downstream.	x H = 3,6x3,5x4,7m, reinforced concrete and brick structure). + Energy dissipation basin after water intake: size of BxHxL=2,6x1,5x4m, reinforced concrete structure.
5	Channel system	- Channel system was built in 2008 from different funds. The system has total length of 5 km, size of B x H = 0,5m x 0,5m or 0,3m x 0,3m and structure of ashlars stone M100. - Channel system is still working well	Preserved
6	Management road	It is connected with inter-village road (B = 3m). The length of management road is 110m with the soil-road and makes some difficulties for transportation. Operational road from crest to weir is a path-way with a breadth of 0,5m. There is not separated operational road for the weir.	Rehabilitate construction road of the dam, weir for management road for dam, water intake, and weir. Cross section of management road is designed as below: - Slope : i = 2,5% - Structure: Concrete of M200 with a thickness of 20cm.
7	Management and operational house	It is located on the right shoulder of the dam. It is now fully broken.	Management and operational house is placed at the downstream of the dam, on the right shoulder with a distance of 50m, total area of 500m^2, floor space of 50m^2, structure of bricks, and roof of reinforced concrete of M200 with electricity system, water and ventilation.

2.2.2. Existing condition of the dam:

Figure 2-2: Dam face

Figure 2-3: Dam face

Figure 2-4: Left shoulder is eroded by rain

Figure 2-5: Left shoulder is eroded

Figure 2-6: Entry of weir

Figure 2-7: Damages caused by the overflow

Figure 2-8: Tower of water intake

Figure 2-9: Management house

2.3. The construction schedule

2.3.1. Construction volume of work items and transport of materials

Constructionvolume of work items is provided in Table 2-3.

Table 2-2: Volume of the main work items

No	Work items	Unit	Volume
1	**Earth dam**		
1.1	Flowage line	$103m^3$	
1.2	Excavation	$103m^3$	51.93
1.3	Soil filling	$103m^3$	41.00
1.4	Reinforced concrete for dam face	$103m^3$	1.05
1.5	Steel	tons	52.56
1.6	Concrete for dam face M200	$103m^3$	0.49
1.7	Pavestone	$103m^3$	1.23
1.8	Grass	$103m^2$	5.74
2	**Water intake**		
2.1	Excavation	$103m^3$	18.58
2.2	Soil filling	$103m^3$	10.37
2.3	Concrete	$103m^3$	0.04
2.4	Steel	tons	3.04
3	**Spillway**		
3.1	Excavation	$103m^3$	20.28
3.2	Soil filling	$103m^3$	1.99
3.3	Concrete	$103m^3$	1.88
3.4	Steel	tons	124.13

- Transportation of construction materials (see in Table 2-3)

Table 2-3: Transportation of construction materials for Dai Thang Reservoir

Items	Location	Quantities/ reserves	Transport distance/ route
Borrow	At the hillside on the left shoulder of Reservoir	50.000 m3	Route: along the reservoir to 1) the dam with a distance of 300m, 2) the weir with a distance of 100m
Quarry	Buying at Chi Ne town	ND	Distance: 20km, Route: Chi Ne town, inter-provincial road #438, inter provincial road 479, 479B, An Binh commune,
Dumping site	At mountain-arm in Thang Loi village	Area: 9850m^2	Distance:1,9km, Route: Thang Loi village, inter-village road (between Duc Binh and Thang Loi)
Material shop	Chi Ne town	ND	Distance: 20km, Route: Chi Ne town, inter-provincial road #438, inter provincial road 479, 479B, An Binh commune,
Construction materials store	Including 2 stores: - The first store: located closely to inter-village road of An Binh commune and construction road of the dam. This zone will be functioned forsub-project management team and consultant place, steering committee place, word yard, storage for construction of earth-dam and water intake - The second store: located next to spillway, functioning for construction of spillway,	- Area of the first store: 60m^2 - Area of the second store: 500m^2.	Within the construction area of sub-project

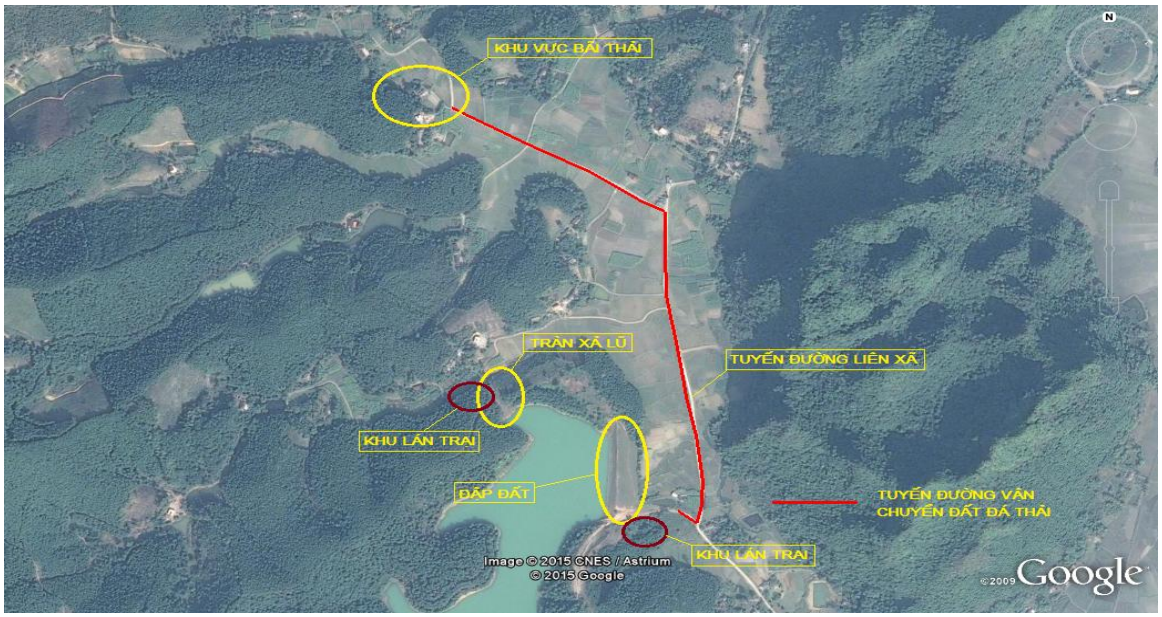

Figure 2-10: Position of auxiliary works in Dai Thang reservoir

Figure 2-11: Proposed disposal area

Figure 2-12: Proposed camping site

2.3.2. List of machines using in the sub-project (List of main machines)

Currently, many types of machines with different origins and labels can be used. According to contractor, machines using in the sub-project would be selected to meet the requirements of critical of Environmental protection Law of Vietnam Government. The main machines can be named as: concrete mixer, concrete vibrator, vibratory rammer, steel cutter, tipper lorry….. These are imported from abroad.

Table 2-4:List of construction machines

No	Machines	Specification	Unit	Quantity	Requirement
1	Concrete mixer	250l	Piece	3	All vehicles must have the "certificate of inspection standards of quality, technical safety and environmental protection" consistent with Decision No. 35/2005 / QD-BGTVT; in order to avoid excessive noise caused by machinery are not maintenance regular - Qualified technical safety and environmental protection specialized motorcycle road traffic participants (22 BC 278-01) - Qualified technical safety and environmental protection of road motor vehicles (22 BC 224-01)
2	Concrete vibrator	1.5KW	Piece	2	
3	Platform vibrator	gasoline	Piece	5	
4	Vibratory rammer	Gasoline	Piece	5	
5	Vibrator	9T	Piece	2	
6	Steel cutter		Piece	1	
7	Steel bender		Piece	1	
8	Welding machine		Piece	1	
9	Hand drill		Piece	1	
10	Pump		Piece	4	
11	Back hole	$1.2m^3$	Piece	4	
12	Motor grader		Piece	2	
13	Tipper lorry	5-7T	Piece	7	
14	Watering truck	m^3	Piece	1	

Labor/workers

In construction duration, it might require a maximum labors of 52, deviding by two shifts in a day.

Manner of construction

- Foundation :

- Pull out the weeds to make the plan by using Motor grader 110CV.
- Foundation excavation by a digging machine 1.25m3;
- Ground excavation by a module of digging machine V = (0.8 ÷ 1.2) m3, Motor grader (110 ÷ 140)CV, transported by a dump truck (5 ÷ 7)T to fill up construction plan and dumping site with a transportation distance of 1.9km

- Drainage for foundation:
- Drainage for foundation including initial concentrated water and permeates.
- Tool: centrifugal pump

- Excavation and transportation of soil :
- Ground excavation by a module of digging machine V = (0.8 ÷ 1.2) m3, Motor grader (110 ÷ 140) CV
- Transported by a dump truck (7 ÷ 10) T
- Gravel by motor grader (110 – 140) CV
- Skim by a vibrator 9T, combined with partial handling-compact.

- Construction of dam face :
- Construction of dam face requires a step-by-step process, including:ground spreading, skimming and vibrator.

- Concrete and reinforced concrete:
- Set up reinforced and mould by handling.
- Mix concrete by moving concrete mixer, vibrate by concrete virbator and vibrator.

- Planting the weeds on the downstream face :
- Spread out a layer of rich soil with a thickness of 10cm.
- Plant the selective weeds on the downstream face.
- The sods must be planted according to designate requirement, watering the weeds.

- Mould:
- Using timber mould, set up on site.

- Steel
- Steel is proceeded in the factory with the proper zise, type then transported to the site work by block truck.

- Stone-paved
  - Mix ciment grout and sand by a grout mixer 100 – 150L. Stone is paved by handling.

- Installation

  Equipments including steel pipe, screen, valves will be transported to the site work for integration and installation.

2.3.3. Implementation duration

Proposal implementation duration of the sub-project for Dai Thang Reservoir is 07 months (not including prepartion duration). It will be started from Nov, 2015 and finished by May, 2016. Therefore, implementation duration is in the dry season. Implementationsequence

and duration of work items are provided in Table 2-4. In construction phase, there will be interrupted impacts due to water shortage, resulting in about 57 ha of paddy rice being lost of water (in one crop season of 244 households). When spillway is discharged, more than 1800 m2 of paddy rice in Duc Binh will be affected in two crop seasons. Implementation process of this subproject is provied in Table 2-5:

Table 2-5: Proposal implementation duration

No	Work items	Time							
		Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**
1	Preparation works and pull out the weeds	→							
1.1	Make-up and clear the ground	→							
1.2	Road rehabilitation	→							
1.3	Set up tents	→							
2	Water intake, main dam		→	→	→	→			
3	Rebuild management house		→	→	→	→	→	→	→
4	Spillway		→	→	→	→	→	→	

PART III: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

Subproject of "Repairing and improving safety of Dai Thang Reservoir of Hoa Binh province" impact to the ethnic minorities groups, the sub-project areas does not have natural forests, biodiversity conservation areas, wetlands or the threatened species (includes fauna and flora species). The major impacts of the sub-project to the natural environment relate to the activities of land excavation, reparation of headwork of dam, material and waste transportations, borrow pit exploitation, and some impacts on the local committees due to temporary land acquisition (12 affected households). The applicable policies, institutional frameworks for environmental and social impacts assessment of the sub-project can be explained below:

3.1. Applicable National Laws and Regulations

a) Environment

Law on environmental protectionno.55/2014/QH13, on Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment. Environmental report should be carried out simultaneously with the establishment of investment projects (Feasibility study report). Requesting time for EA report making, delivery and appraisal are specified in section no.2 of Article no.13 of Decree no.21/2011/ND-CP. Environmental screening steps (typical environmental assessment to the project) should be done in accordance with the list of projects type in Annex 2 of the Decree no.18/2015/ND-CP

Environmental impact assessment (EIA). In chapter 4 of Decree no.18/2015/ND-CP on date 14/02/2015, from the article 12 to article 17 were specified in the formulation, evaluation and approval of environmental impact assessment reports, the implementation of projects and the designed mitigation measures to protect environment before and after a project officially operation. In the article 12 of this Decree also regards on environmental impact assessment process to the project implementation, the project owner have to organise meetings to public consultants, such as Provincial People's Committees, local authority (Commune People's Committees level- CPC), affected (direct or indirect) people or committees in the local by the project implementation, mandatory; analysis the feedbacks, comments obtained from the affected groups, and consider advantage or disadvantage the impacts of the project to community and to design the mitigation measures to reduce the negative impacts on natural environment, biodiversity, community. According to the annex no.2 of the Decree, the project has to make EIA if the reservoir capacity is of 100,000m^3 or more.

Environmental protection plan. Chapter 5 of Decree no.18/2015/ND-CP on date 02/14/2015, from Articles no. 18 and no.19 and the Annex II of this Decree defined that a new project implementation, or scale extension, increasing capacity have to identify the affecting objects and have to make a plan of environmental protection

According to the regulations of Vietnam Government, the subproject "*Repair and Improvement for Safety ofDai Thang reservoir- Hoa Binh province*" have to perform the report of Environment Impact Assessment.

b) Dam safety regulations

Decree no. 72 /NĐ-CP on date 07/05/2007 of the government of Vietnam on dam safety management. According to the decree, a big dam is the dam with the height calculating from the floor face to the top of the dam equal to or greater than 15 meters or dam of water reservoirs with the scale of capacity equal to or greater than 3,000,000 m^3 (three million cubic meters). Small dam is the dam with the height calculating from the floor face to the top of the dam smaller than 15 meters. Dam owners are organizations and individuals owning dams to harness the benefits of water reservoirs or assigned to manage, operate and harness water reservoirs by the competent state agencies. Ministry of Agriculture and Rural Development takes responsibility before the Government for the implementation of state management of dam safety. The Ministry of Industry presides over and coordinates with ministries, branches and relative localities to appraise, approve or submit to the Prime Minister for approval of the process of operating hydropower reservoirs. The provincial-level People's Committees implement its state management on dam safety in the areas.

c) Land acquisition by the State and Resettlement policies

Land Law no. 45/2013/QH13, effected on 07.01.2014, this law prescribes the regime of land ownership, powers and responsibilities of the State in representing the entire-people owner of land and uniformly managing land, the regime of land management and use, the rights and obligations of land users involving land in the territory of the Socialist Republic of Vietnam. The law also gives the guidance on Land acquisition, recovery and compensation, resettlement and the requirement to ensure safety of dam corridor and reservoir, irrigation works, etc.

d) Policy for Ethnic Minority community development

- Decree No. 82/2010/ND-CP dated 20/7/2010 of Government on teaching and learning the ethnic language in the schools.
- Decree No. 60/2008/NĐ-CP dated 9/6/2008 of Government regulating the functions, tasks, responsibilities and organization structures of Ethnic Committee.
- Decision No. 06/2007/QD-UBDT dated 12/1/2007 of Ethnic Committee approving Communication Strategy for 135 Program – phase 2.
- Decree No. 70/2001/ND-CP: all registration documents of family assets and land use rights must be filled the names of both husband and wife.
- Decision No. 134/2004/CP dated 20/7/2004 of Government on policy of supporting productive land, residential land, house and domestic water for the poor and difficult ethnic households.
- Decision No. 03/2005/QĐ-BNN dated 07/01/2005 of Minister of MARD regulation the wood exploitation to support house construction of the poor and difficult ethnic households in line with Decision No. 134/QĐ-TTg dated 20/7/2004 of Government.

- Decision No. 33/2007/QĐ-TTg, dated 05/3/2007 of Government on the support policy on immigration and sedentarization for ethnic minorities;
- Decision No. 32/2007/QĐ-TTg dated 05/3/2007 of Government on the loans for production development of especial difficult ethnic households.
- Decision No. 1592/QĐ-TTg dated 12/10/2009 of Government on continuing implementation of some policies to support productive land, residential land, house and domestic water for the poor and difficult ethnic households.
- Decision No. 05/2007/QD-UBDT dated 06/9/2007 of Ethnic Committee approving three Ethnic Minority regions and mountainous region based on the development situation.
- Circular No. 06 dated 20/9/2007 of Ethnic Committee guiding the support services for livelihood improvement of local people, technical assistant to improve knowledge on Law enforcement in line with Decision No. 112/2007/QD-TTg.
-

3.2. Safeguard policies of WB

The safeguards policies of World Bank given in the form of operational policies (OPs), which includes 10 triggered policies, included the important policy OP 4:01 environmental assessment. Here are a summary of World Bank's policies that's related to the sub-project:

Table 3-1: Selected environmental and legal safeguard policies of WB relate to the sub-project

Policy	*Objective*
OP 4.01 Environmental Assessment	- To ensure the environmental and social soundness and sustainability of investment projects. - To provide decision makers with information on potential environmental and social impacts related to the project. - To enhance the transparency and participation of affected communities into the decision making process.
OP 4.37 Safety of Dams	To ensure that dam safety issues are adequately addressed, especially for high and/or risky dams: - The policy involve to new dams construction - The issues occurs by the existing dams and dams under Construction he - The other important issue: dam height, reservoir capacity, suitability of safety standards
OP 4.12 Involuntary Resettlement	- To ensure that the following policies will be applied: - Avoid or minimize involuntary resettlement and impacts on economic activities, including loss of livelihoods - Provide transparent compensation procedures during involuntary taking of land and other assets - Provide sufficient investment resources to enable the persons displaced by the project to share in project benefits (implemented through the Resettlement Action Plan) - Restore and improve the standards of living of persons affected by the project - Provide prompt and effective compensation at full replacement cost for losses of assetsattributable directly to the project. Development of

	Resettlement Plan and mitigation measures must be carried out based on consultation with affected populations and participatory approaches.
OP/BP 4.10 Indigenous Peoples and Ethnic Minorities	- This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. - In deciding whether to proceed with the project, the borrower ascertains, on the basis of the social assessment and the free, prior, and informed consultation, whether the affected Indigenous Peoples' communities provide their broad support to the project. - Through the policy, project proponents are to identify indigenous peoples, consult with them, ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way and that adverse impacts on them are avoided, or where not feasible, minimized, or mitigated. - Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.

PART IV: NATURAL, ENVIRONMENTAL AND SOCIO-ECONOMIC CHARACTERISTICS OF SUBPROJECT AREA

4.1. Physical condition

4.1.1. Natural conditions

Climate and hydrology Conditions

a) Characteristics of climate of the project area is tropical monsoon, with two clear seasons in year: the dry season and the rainy season. The average humidity was about 75 ÷ 87%, the highest in the month VIII and IX. The annual average temperature over 23 ° C, the highest monthly average is 29^{o}C, the lowest monthly average is 16.5^{o}C (in recent 5 years). The coldest season of Lac Thuy is from mid-November last year to the end of February.

Every year, the study area has been influenced by monsoon winds in two main seasons of the year: the northeast monsoon wind and southwest monsoon wind. The main wind directions: In the summer from May to September is from the Southeast to the Southwest, in winter from October to April is from the east to the northeast. Wind speed annual average of 1.3 m / s.

b) The project area belong to the Midlands province of Hoa Binh and the average temperatures are not so high. The annual average temperature is about 23.6^{o}C. Air humidity of the project area does not change so much. The highest average humidity is in August with average monthly relative humidity is at 87% Chi Ne station the lowest one usually occurs in November and December with moisture December average of 80% in Chi Ne station.

c) The total number of sunshine hours per year reaches to 1447.8 hours, the average number of monthly sunshine hours is 120. Total number of sunshine hours in 1 year in the sub-project area is relatively low, 1447.8 hours (i.e. an average of 4 hours / day in recent five years). The minimum sunshine intensity is in February because this is rainy season.

d) The rainy season starts from May to October. During the rainy season, total rainfall is quite high: approximately 1.900mm to 2000mm, mainly focusing on July, August and September. The dry season starts from November last year and ended in April of the following year. In the rainy season, due to the presence buffer and dissected topography combined with heavy rain caused flooding, flash floods affecting productions and people's life.From precipitation observation data, after calculation, the final result was shown in following table:

Table 4-1: Characteristics of rainfall subproject zone (average in recent 5 years)

Characteristics	Month												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
Amount of rainfall (mm)	22.9	20.8	43.3	70.7	213.1	226.0	304.7	354.1	343.6	222.4	70.0	18.5	1910.2
Maximum rainfall (mm)	60.6	75.0	146.9	127.9	188.5	170.4	249.3	304.4	393.7	321.1	250.7	31.0	393.7
Yearly rainfall	2010	1976	1990	1999	1973	1974	1996	1975	1980	2008	1996	2005	1980

The water gauge stations, meteorological and hydrological used in the calculation belongs to the sub-project of Dai Thang reservoir:

Due to the basin of Dai Thang reservoir is too small, the consultants have used the data in the neighbor stations called Chi Ne with conditions similar hydrological to calculate. This station has completed monitoring, having continuous meteorological factors (from 1973-2013), and not far from the project area, about 10km; Lam Son rain gauge stations with adequate data at good quality can be guaranteed for calculation. In addition to this, An Binh rainfall station with the set of rainfall data from 1973 to 1985, has now stopped measure at moment.

For calculating flood flows in basin, because of lacking the dynamic data at the stations, so this project will use the maximum rainfall in the month to design the flood discharge.

Table 4-2: The design Flood peak discharge and its frequency

No	P (%)	Q_{MaxP} Dai Thang (m^3/s)	W_{MaxP} Dai Thang ($10^6.m^3$)
1	**0.2%**	**65.2**	**0.6346**
2	0.5%	57.1	0.5680
3	**1.0%**	**51.8**	**0.5231**
4	1.5%	47.2	0.4834
5	2.0%	44.5	0.4630
6	5.0%	38.4	0.4122
7	10%	32.4	0.3584

Topography

The study area is characterized by the mountainous and midland plains topography. The topography of the commune is mainly hilly and rocky, commune with rivers flowing dams along the length of the commune. There 438B provincial highway passing through the commune along the length of 7 km. Water was drained naturally following the slope of the terrain.

Geological conditions

Geology: The geological background of the construction area is relatively stable, with the streambed is pebble gravel thick from 1-3m, the bottom layer of soil is hard. The top layer is the plant cover thick 0.3-0.5m. The below layer is the the hard soil with semi-weathering rock hard. This layer has small permeability coefficient, ensuring create stable foundation.

Based on geological data were examined and monitored through the work of Geological Society, from top to bottom layer, the soil characteristics was detail in following:

- ***Layer 1a:*** clay, brown yellow, soft plastic state to plastic, less condense.Layer 1a is new sedimentation layer in the reservoir so the thickness has not been determined; This layer has a small permeability coefficient,do it can be effective at the bottom layer of reservoir.
- ***Layer 1***: Land cover layer 1: clay mixed with crushed gravel, yellow brown, auburn red, hard plastic state ~ soft plastic, tightly structured. Layer 1í on toplayer and it cover all the old dam surface (see MC DC-02). Greatest thickness determined in holes K8 is 9.2m..

Following this layer is the transfering layer- layer 2. Soil characteristics in the layer 2: clay mixed small gravel, the top part of this layer is yellow brown, the lower part is mainly red brown, statement: hard plastic to soft plastic

- ***Layer 2:*** transformating layer is under the layer on the dam area. Thickness of the layer changes from both sides of the middle dam (see the geological map).
- ***Layer 3:*** the mixed clay layer contains small gravel, brown-gray, tan, brown, red in color. It is semi-hard to plastic. layer 3 is presented in under the layer 1 and layer 2 in the area in the middle of the dam and in the left embankment of the dam.
- ***Class 4:*** Soil mixed with small gravel and so it is clay, gray-brown, reddish brown. It is hard, medium ~ to tight instructure. Distribution of the layer switches directly under 3rd layer. (between the dam undetermined class) (see geological cross-sections). Layer thickness varies.
- ***Layer 5:*** weathering rock from moderate to strong: This is the bottom layer to determine the total depth in the survey. The lithological characteristics of this layer is the of composition of rock powder was mixed with Metamorphic rocks. This rock was weathered strongly so the colors are gray, yellow, gray, blue-gray. The the cracks of stone is filled with clay material or iron oxide in brown and red color. Weathering rock is quite soft, fragile. However for small and medium -scale dams, the layerccould be good foundation for construction.

Contaminating sources

Within the scope of the sub-project area (An Binh commune), there have only agricultural activities (paddy rice planting, crops- maze, animal husbandry) and other forestry activities like acacia planting. Contaminating source is determined as followed:

- Paddy rice, maze and other crops:

Total paddy rice area of 4 villages is118.3 ha; the maze one is 37 ha and other crope one is around 55.5 ha; it is evenly distributed for 4 villages. During the rice, maze and other crops planting, pesticide and chemical fertilizer is used in the field. This is the contaminating source for water body and earth body on the area-contaminated of the sub-project.

- Husbandry: On An Binh province, the main activities are cow, buffulo, poultry raising, fish planting; in which poultry raising (15,000 ones) and fish plating (total area 18ha) is essential. Poultry raising concentrates on Thang Loi village (more than 10000 ones), fish planting focus on Duc Binh (7ha) and Dai Thang (10ha). Hence, on Thang Loi area, underground water environment and the whole environment may be affected the most; on Duc Binh and Dai Thang, surface water quality is affected the most.

4.1.2. Water environment

a. Surface water environment

Surface water quality at the sub-project area is generally good. All water quality parameters measured are under permissible criteria. Easily explained, the sub-project area has nothing activities for industry, handicraft. The primary production of local people is agriculture and forestry.

In order to assess surface water quality in the area implemented in the sub-project , expertise for site investigaton has executed samples at some typical locations from upstream

to downstream within the affected area of the sub-project. Locations for water sampling is determined as:

Table 4-3: Locations for water sampling for surface water quality analysis

No.	Sample	Locations	Ordinates	
1	NM1	North-lake-water areas	X:574137.66	Y:2258322.13
2	NM2	Middle-lake-water-areas	X:574412.88	Y:2258753.69
3	NM3	Water areas around main dam	X:574534.24	Y:2258826.73
4	NM4	Water areas towards spillway	X:574390.68	Y:2258960.58
5	NM5	Water area at discharge channel after spillway	X:574379.94	Y:2259126.86
6	NM6	Water area at the upstream channel of the main dam	X:574690.86	Y:2258763.60

Results sampling analysis Results of surface water sampling analysis is presented in Table 2-1, Appendix A4

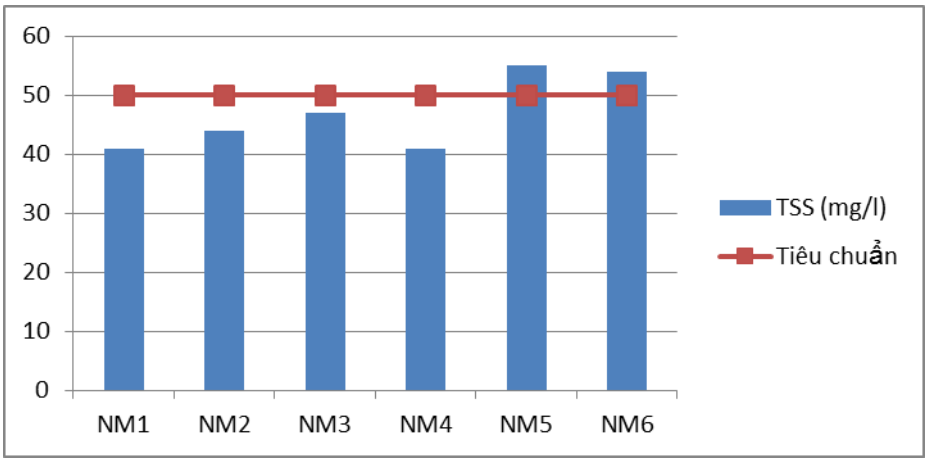

Fig 4-1: Compare TSS concentration at sampling locations with respect to QCVN 08-2008/MONRE

Comments

Comparing the surface water sampling analysis results from upstream to downstream of Dai Thang reservoir and from channel sampling positions to QCVN 08-2008/MONRE (column B1) which is used for aquatics protection, there is only one indicator TSS at positions from discharge channels after spillway and ustream channel of main dam. Other indicators are under permissible limit. Generally, surface water quality at the sub-project area is rather good, no sign of contamination.

b. Underground water

In order to assess underground water quality in the sub-project area, representative groundwater samples is taken and analysed. Positions for underground water sampling is presented below:

Table 4-4: Positions for underground water sampling in the sub-project

No.	Samples	Positions	Ordinates	
1	NN01	At the well of Tran Duc Van household towards spillway	X:574319	Y:2259087.22
2	NN02	At the well of Bui Thi Phuong household. Duc Thang village	X:574718.14	Y:2258751.81
3	NN03	At the well of Bui Van Phuong. Dai Dong village	X:574759.77	Y:2258598.52
4	NN04	At lwell of Dang Van An household. Thang Loi village	X:573631.82	Y:2258155.04
5	NN05	At well of kindergarten	X:576297.97	Y:2257332.10
6	NN06	At well near An Binh people comittee	X:576295.26	Y:2257149.04

Results of underground water quality are proviced in Table 2-2, Appendix A4.

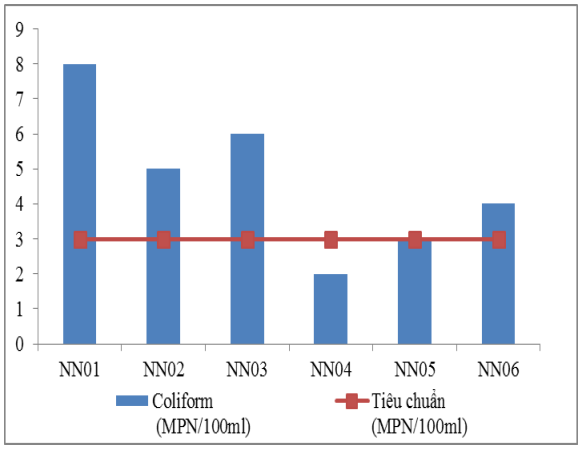

Figure 4-2: Comparing Coliform concentration at sampling positions to QCVN 09-2008/MONRE

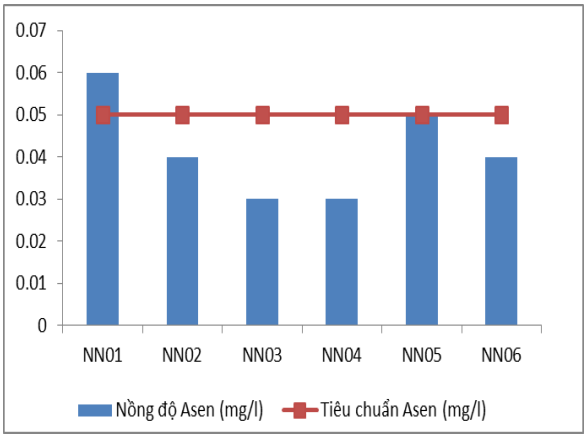

Figure 4-3: Comparing Arsen concentration at sampling positions to QCVN 09:2008/MONRE

Comments:

- Results of underground water quality analysis show that all indicators are under permissible limit of QCVN 09-2008/BTNMT except Coliform and Arsen indicator.
- Coliform indicator in underground water changes complicated; there are 05/06 samples exceed the allowable standard. The highest one is at the well of Tran Van Duc household towards the spillway which is 2.6 times more than the regulated one in QCVN 09:2008. The reason is due to the effect of ammonia accumulated from organic fertilizer, animal body decomposed from the field and its vicinity.
- Arsen concentration in underground water at the sub-project has the sign of contamination. According to analysis, there are 02/06 samples have Arsen concentration higher than the permissible criteria. Sample NN01 at Tran Duc Van, Arsen reaches the highest, 1.2 times higher than QCVN 09-2008/MONRE. The reason for Arsen-contaminated-underground-water source may be rooted from geological tectonic in the area. The analysis results reflect correctly part of people's opions about the status of underground water environment at the locals.

On the locality of An Binh commune, there have exploited underground water source by excavated well or drilled well to serve for production and domestic life of part of residents. Underground water quality is relatively good; most of the indicators are under permissible limit.

4.1.3. Air environment

Air quality at the sub-project area in particular and An Binh commune in general is rather good. Almost all monitoring indicators has reached the allowable standard. Inter-villag routes, inter-commune routes across the Minor Project has caused dust-polluted. However, due to low vehicle density and mountainous regions, the affected scope is trivial.

The primary wind direction of the sub-project area at the time of monitoring is North East. Monitoring air quality indicators is carried out at the end positions of the main wind direction of the Project, and some positions around the construction sites, on the way to transport material.

Table 4-5: Positions for air quality monitoring at the sub-project area

No.	Samples	Positions	Ordinates	
1	**KK01**	Air samples at main dam	X:574641.32	Y:2258850.51
2	**KK02**	Air samples taken at the road to main dam	X:574728.86;	Y:2258698.76
3	**KK03**	Air samples at the spillway	X:574337.74	Y:2259062.54
4	**KK04**	Air samples at the field	X:574612.45	Y:2259128.53
5	**KK05**	Air samles at the inter-commune route before An Binh people comittee	X:576295.27	Y:2257149.05

Analysis results

- Results of air quality analysis in the sub-project on 1/2015, made by Hydro-power and renewable energy institute taken from SUB-PROJECT region, An Binh commune include dust indicator PM10, SO_2, CO and NO_x. It shows that content of these indicators are lower than criteria due to QCVN 05:2009/MONRE.
- Results of air quality are provided in Tabl2 2-3, Appendix A4.

Comments: From air environment monitoring results at 5 locations KK01. KK02, KK03, KK04, KK05 some comments are given:

- Compare criterion TPS, noise, CO, SO_2, NO_2 content with QCVN 05-2008/MONRE (air quality), it is seen that all these indicators reach criteria.
- Generally, this region has good air quality, no sign of air pollution.

4.1.4. Soil environment

4.1.4.1. Soil resources in the sub-project region

In the sub-projectregion has the following main soil groups:

Alluvium group: This group is distributed into narrow strips along the Dap river. Alluvium group has 3 main soil units: gley alluvium, hydrated alluvium; typical alluvium and 7 auxillary soil units.

Black soil group is not plenty of area. Black group has 2 soil units: black soil in water, typical black soil and 5 auxillary soil units.

Grey soil group has great area, distributed all over the sub-project region and the proximity. Grey soil group has 4 soil units: grey soil with hard rock layer, hydrated grey soil, dark grey soil, typical grey soil and 10 auxillary soil units.

Via investigated documents it can be commented on agricultural production quality at An Binh commune as follow:

+ Agricultural soils have mechanical components changing relatively high from mixed sand to heavy clayey loam soil, in which black soil has the heavier mechanical component.

According to statistical data of land, 2014, An Binh commune has 3018.70 ha of natural land, take 9.58% of the district area. Of which land used land is 2261,19 ha, take 74.91% natural land area of the whole commune. Agricultural land area is 1854.34 ha (including paddy rice area and other annual crops); residential area is 58.34 ha; land for business and commercial is 8.21 ha; land for infrastructure is 179.95 ha. The remain is unused land with area of 757.51 ha[1].

4.1.4.2. Status quo of land usage in the sub-project region

The status quo of land usage in the sub-projectproject region is presented in table 4.19 below. Due to table 4.19, about ¾ of land area in the sub-projectregion is being used, including agricultural land and non-agricultural land; the remain is unused land.

Table 4-6: Status quo of land usage at the sub-project region

Type of land	**Area (*ha*)**	**Proportion (%)**
Total natural land area	3018.70	100.00
I. Being used land	2261.19	74.91
1. Land for agriculture	1854.34	61.43
In which: - Land for agriculture production	825.67	27.35
- Paddy rice area	350.87	11.62
− Land for annual crops	464.74	
− Grass land for husbandry	10.40	
− Land for other annual crops	103.47	
− Land for perennial crops	247.06	
− Land for forestry	1106.54	
− Forest land for production	1036.81	
− Forest land protection	69.73	
2. Non-agricultural land	406.85	13.48
In which: - Residential land	58.34	1.93
- Land for business	8.21	0.27
- Land for infrastructure	179.95	5.96
II. Unused land	757.51	25.09

4.1.4.3. Soil quality

- Soil quality in the Minor project region is typical for mountainous midland, low hill with soil PH fluctuates from 7.1-7.4; phosphorus content (P_3O_4), Nitrogen is at medium level.

Heavy metals like Cadmium, lead, mercury and arsen on earth is under maximum allowable limit (QCVN 03:2008-MONRE - National technical regulation on the allowable limits of heavy metals in the soils)

- Analysis results of soil quality in the Minor project region on January 2015 are made by samples analysis office as below:

a) Locations for sampling

Table 4-7: Locations for earth environment monitoring at the sub-project region

No	Samples	Locations	Ordinates	
1	**Đ01**	Soil sample at the main dam	X:574641.32	Y:2258850.51
2	**Đ02**	Soil sample taken on the way to main dam	X:574728.86;	Y:2258698.76
3	**Đ03**	Soil sample at the spillway area	X:574337.74	Y:2259062.54
4	**Đ04**	Soil sample at the field	X:574612.45	Y:2259128.53

a) Analysis results

Table 4-8: Results of soil monitoring at the sub-project region

No	Indicators	Units	Samples				QCVN 03:2008/MONRE (mg/kg)
			Đ01	**Đ02**	**Đ03**	**Đ04**	
1	pH	-	7.2	7.4	7.0	7.1	-
3	Total dissolved salt	%	12	18	12	12	-
4	Mobile Aluminum	mg/kg	1.8	3	2.2	2.4	-
5	Total N	%N	0.168	0.116	0.147	0.125	-
6	Total P	$\%P_2O_5$	0.125	0.164	0.145	0.132	-
7	Zn	mg/kg	4.48	5.24	4.23	5.67	**200**
8	As	mg/kg	8.5	8.0	4.5	8.6	**12**
9	Pb	mg/kg	3.6	6.5	2.7	4.5	**70**
10	Cd	mg/kg	<0.05	<0.05	<0.05	<0.05	**2**
11	Cu	mg/kg	3	5.6	5	4	**50**

Notes:

- *QCVN 03-2008/MONRE:* National technical regulation on the allowable limits of heavy metals in the soils
- *"-" Not specified values*

Comments:

- Results of sol quality analysis contain PH, total dissolved salt, mobile aluminum. total N.P; heavy metals Ca. Mg. They show that content of these parameters is lower than allowable criteria due to QCVN 03:2008/MONRE.

- Contents of N on the soil from 0.116-0.168%; Content of P fluctuates from 0.125-0.164%; hence soil at An Binh commune has the N total and P total at medium level

- Content of Cd, Pb, Zn, Cu is lower than criteria for land using for agriculture, forestry, people's life, commercial and industry due to QCVN 03:2008/MONRE.

4.2. BIOLOGY ENVIRONMENT

Based on the analysis of the number and the structure, composition of the species and of the biodiversity index, the characteristics of the biological environment at the variuos sites have been assessed.

4.2.1 Terrestrial ecosystem

a. Flora system

According to the survey carried out by the Institute of Hydropower and renewable energy in colaboration with the Ecological Institute in February 2015, the predominent ecosystem in the subproject is considered as the agro-forest ecosystem. In the type of this ecosystem, the reforestation takes place, then the short-term industrial trees follow up, paddy rice and secondary crop.

The major flora in the subproject area:

- *Floristic composition with the crops in the farmland:*

There are twelves types of this flora in which most of them are short term crops and farm produce. This is the flora with a fraction of 2/3 of area surrounding Dai Thang Reservoir.

- *Floristic composition with forestry closely to the hill:*

The main forestry here is acacia with the largest area in the subproject zone.

- *Floristic composition with fruit trees in residental area:*

There are twenty main types of this floristic composition. This is the flora with the smallest area in subproject zone.

The floristic cover:

In general, the floristic composition surrounding Dai Thang Reservoir is abundant, without empty space phenomenon. The covered level of flora in this area mainly comes from acacia and grass. With a majority of acacia, local residence can combine the forestry exploitation with forestry cover purposes.

The flora with economic values

Crop plants: In the subproject zone, plants are limitted, in which acacia are the major. Those acacia are commonly planted due to their economic value to the local economic development.

Fruit tree: They are jack-tree, litchi.....; however they are not widely planted.

Yearly plants: They are paddy rice, sugar cane. In addition, there are some others farm produces such as sweet potato, cabbage, kohlrabi, potato, etc...

b. The fauna system

Surrounding Dai Thang Reservoir are livestock, for examples: buffalo, cow, pig, and others poultries (chicken, duck....).

There are not rare and valuable annimals within subproject area.

4.2.2. Aquatic ecology

Sampling points of aquatic ecology are sampling points of surface water resource in the subproject area which is provided in Table 4-19:

Table 4-9: Ecological sampling in the subproject area (Time: 06th, Feb, 2015).

No	Sampling symbol	Location	Coordination	
1	NM01	Reservoir water in the North	X:574137.66	Y:2258322.13
2	NM02	Reservoir water at the middle of Dai Thang	X:574412.88	Y:2258753.69
3	NM03	Reservoir water closely to water intake	X:574534.24	Y:2258826.73
4	NM04	Reservoir water closely to the weir	X:574390.68	Y:2258960.58
5	NM05	Irrigation channel water in Duc Binh village – downstream of the weir. affecting construction stage	X:574379.94	Y:2259126.86
6	NM06	Irrigation channel water on the way to the main dam. affecting construction stage	X:574690.86	Y:2258763.60

4.2.2.1. Macrophyta

Macrophyta in this subproject area including:

- *Floating-leaved macrophyte:* they root to the bottom layer of aquatic basin and float their leaves on the surface of water level.
- *Freely floating macrophyte*: They are water-fern with fasciculate root, submerged in the water. In Dai Thang Reservoir, there are a fews of duckweed.
-*Emergent macrophyte:* They have the roots in the bottom of the basin, their body and leaves on the surface of the water. In addition, paddy rice is also considered as the crop plants. As not as paddy rice, emergent macrophyte are not polluted by pesticides.

4.2.2.2. Phytoplankton

There are many types of algae in which green-blue algae (i.e. *Microcystis sp, Chlamydomonas angulosa,....*) and filamentous alage (typically as *Phormidium sp.)* are basical. In Dai Thang Reservoir, there are not corkscrew algae (*Spirullia,....).* Phytoplankton in this area are tropical phytonplankton and widely distributed. Therefore the diversity of phytonplankton in Dai Thang Reservoir is at the low level.

4.2.3. The sensitive areas

There are not submerged land, park or conservative, ecological-concervative, genetic storage and biosphere as well as security and military zones in the subproject area.

4.3. SOCIO-ECONOMIC AND SOCIO-CULTURAL ENVIRONMENT

Socio-economic and socio-cultural baselines of the subproject are also assessed as natural baseline, considering indirect and direct affected zones, primary and secondary affected zones. Thus, scope of the assessment (i) Direct Influenced Area (DIA): social environment at the rehabilitation zone of the dam (Duc Binh village); (ii) Secondary Influenced Area during water-cut-off stage (Dai Thang village, Thang Loi village and Dai Dong village) and (iii) Indirect Influenced Area (IIA): An Binh commune.

The implementation of the subproject affects four above villages, including positive and negative impacts as followings:

- Households are impected during construction stage (Duc Binh village)
- Households are impacted when discharging the weir at condition of temporary flood (Duc Binh village).
- Downstream households are impacted when water is cut off (in one season) during construction stage (Dai Dong, Thang Loi and Dai Thang villages)
- Households are impacted due to transportation of materials (Duc Binh village)

4.3.1. Population

4.3.1.1. Employment poplulation

Upto 2014, population of the subproject is 1,420 habitants. Dai Thang Reservoir and the main work items of the subproject are located in Duc binh village and affected areas are located in three villages (Dai Dong, Dai Thang and Thang Loi).

Table 4-10: Population and average labor in households

	Population	**household structure according to member number (%)**			
	Average people in household	**1-2 people**	**3-4 people**	**5-8 people**	**>9 people**
Total	4.0	16.8	48.4	34.8	0.0
By village					
Duc Binh	3.8	17.4	52	30.6	0.0
Dai Dong	4.2	9.2	47.5	43.3	0.0
Dai Thang	4.1	18.2	43.7	38.1	0.0
Thang Loi	4.1	15.3	47.1	37.6	0.0
By ethnic					0.0
+ Kinh	3.9	18.7	51.7	29.6	0.0
+ Ethnic minority	***4.1***	***14.6***	***45.8***	***39.6***	***0.0***
By owner's gender					0.0
+ Male	4.1	19.7	41.3	39	0.0
+ Female	3.9	19.2	53.8	27	0.0
By income group					0.0
Group 1 (poorest)		26.1	38.4	35.5	0.0
Group 2		15.6	44.4	40	0.0

Group 3		16.4	46.8	36.8	0.0
Group 4		9.8	51.7	38.5	0.0
Group 5 (richest)		17	52.1	30.9	0.0

Source : Survey data

According to Table 4-13, the average population survey area is 4 people/household, greater than it in the whole country (3.89 people/ household – According to Yearly statistical, 2013). The number of people in a households is different within 4 villages, only 16.8% of households with 1 – 2 people; 48.4% of households with 3 -4 people; 34.8% of households with 5 -8 people and 0% of household withe greater than 9 people. Considering income group, households of 3 – 4 people are the most similar. This result shows the nuclear family is becoming commonly in the subproject area.

4.3.1.2. Labor ages

The labor within the ages of 16 – 60 in 4 villages is about 18.6% (calculated for the whole commune, based on reported data from the villages). As an agricultural commune and due to a far distance from the center of Hoa Binh province and the main roads, the fraction of people working on agrio-forestry area is the largest, showing by 78%.

Table 4-11: Labor status within the ages of 16 – 60

Village	**Total of labor in economic activities**	**Direct labors**			
		Agrio-forestry labors		Non-agrio-forestry labors	
		Total	Tranied labors	Total	Tranied labors
Duc Binh	190	145	16	45	22
Dai Dong	350	280	30	70	31
Dai Thang	147	117	16	30	19
Thang Loi	166	121	18	45	18
Total	4574	3567	80	1007	90

Source: Statistical data in An Binh commune

Table 4-12: The ratio of the labor by gender

No	**Village**	**Male (%)**	**Female (%)**
1	Dai Thang	46	54
2	Thang Loi	45	55
3	Dai Dong	53	47
4	Duc Binh	53	47

Source: Statistical data in An Binh commune

4.3.1.3. Labor distribution in job proportion

Based on the newest report in 2014 about conductivity of the job opportunities increaing in An Binh commune, there are some significant results. For instance: More labors move in

industry, construction and service. However, as mentioned in section 4.3.1.2, the ratio of the labors in agrio-forestry activities of these four villages is still high.

Table 4-13: Report of the job opportunies increasing in 2014

No	Village	Number of labors with the works							
		Total	Gender		Zone		Economic group		
			Male	Female	Urban	Rural	Agrio- forestry and aquaculture	Industry and construction	Service
1	Dai Thang	37	17	20	0	37	11	10	16
2	Thang Loi	85	38	47	10	75	32	33	20
3	Dai Dong	186	99	87	10	176	92	50	44
4	Duc Binh	90	48	42	10	80	37	28	25

Source: Annual report in 2014 – An Binh commune

According to the survey results, the proportion of households in agrio-forestry reached to the highest ratio, as found as 53.1%; the decrease order of remaining sectors was students (24.7%) > senior, executive and worker (<10% of each). A few small industries was appeared in Kinh households and there was not occurance of it in Muong housholds. In general, agrio-forestry is the majority of economy in subproject area.

Table 4-14: Main jobs of the labors (including members of the households)

	Disablement	Agrio-forestry and fishery	Trade, service	Senior, executive	Students	Small industry	Employment	Unemployment	Discrepancy	Others
Total	4,3	53,1	2,6	3,2	24,7	0,6	4,9	0,8	3	2,8
By village										
Duc Binh	4,3	50,8	3,3	3,2	26,3	2,6	3,8	0,2	2	3,5
Thang Loi	4,7	52,6	3,0	3,4	25,3	0	5,8	1,1	1,8	2,3
Dai Dong	3,8	53,7	2,0	3	24,8	0	6,3	0,8	2,4	3,2
Dai Thang	4,6	52,1	1,7	3,4	23,6	0	6,1	1,2	4,2	3,1
By ethnic										
+ Kinh	4,2	52	3	3,5	26,5	2,6	3,6	0,2	2,1	2,3
+ ethnic minority	4,6	53,6	2	2,6	23,5	0	6,1	1	4	2,5

In comparison with reality, these results are fit general conditions of An Binh commune. As an agricultural commune with a far distance from the center of Hoa Binh province and main roads, job proportion of the members in low income households is still high. A lower ratio of agrio-forestry and aquaculture of Kinh ethnic compared to ethnin minority was presented, by 52% for Kinh and 53,6% for ethnic minority. In contrast, the ratio of Kinh households in small industries was 2,6%, whilst it of ethnic minority was not mostly occurred.

4.3.2. Socio-economic

As seen in Table 4-15 (*Annual report in An Binh commune, 2014)*, it is concluded that the movement of the labor proportion in subproject area is tended to industries and services. This is understandable and fit general condition of An Binh commune.

Table 4-15: Indicators of socio-economic in An Binh conmmune, stage of 2005 – 2010 – 2014

No	Item	Unit	In 2005	In 2010	In 2014
1	**Total of productive value**		**23,105.0**	**69,560**	**182,952**
1.1	*Agrio-forestry and Aquaculture*	*Million*	***19,154***	***44,786***	***87,817***
-	Farm	Million	14,768	28,222	
-	Forestry	Million	747	4,704.0	6,412
-	Livestock	Million	3,256	11,000	
-	Aquaculture		383	860	
1.2	*Industry. small industry and construction*	*Million*	***1,580***	***12,254***	***40,249***
-	Industry and small industry	Million	1,106	8,577	
-	Construction	Million	474	3,677	
1.3	*Trade and service*	Million	***2,371***	***12,520***	***54,886***
-	Trade	Million	*1,825*	*8,764*	
-	Service	Million	*546*	*3,756*	
2	**Proportion of productive value (%)**	**(%)**	**100**	**100**	**100**
-	Agrio-forestry and Aquaculture	(%)	82.9	64.4	48
-	Industry. small industry and construction	(%)	6.8	17.6	22
-	Trade and service	(%)	10.3	18.0	30
3	**Total of grain food yield**	**Tons**	**2,603**	**3,500**	**4029.5**
4	Average per captia income per year	Million	3.4	10.4	24
5	Average per capita food per year	Kg/cap.yr	420	470	530
6	Average productive value per 1ha of farmland	Million	18	21	30

Source: Annual report in An Binh commune, 2014

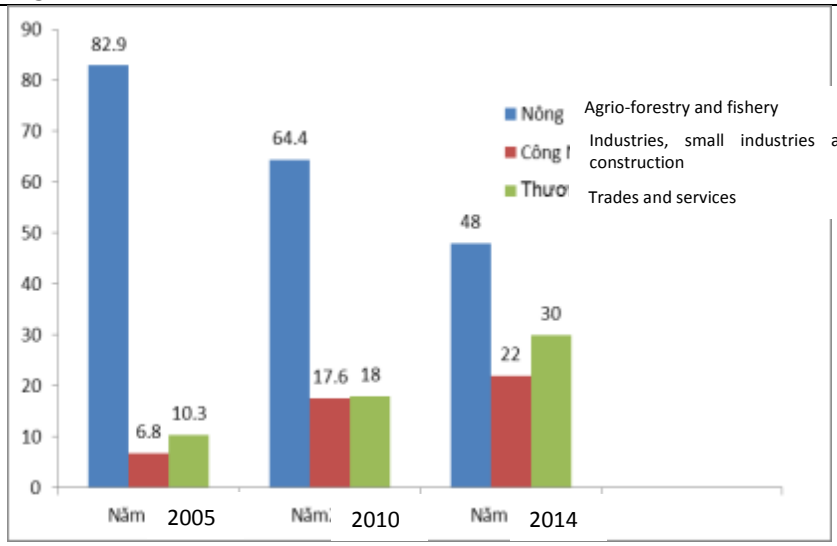

Figure 4-4: The proportion of economic sectors through stages

In 2014, total of productive value was estimated of 182,952 million, increased of 12.5% in comparison with the same period of last year. The proportions were 22% for industry, 30% for service and 48% for agricluture.

(a) In recent 5 years, economic proportion of An Binh commune has changed but not equated. Proportion of agrio-forestry has lightly decreased and still stayed at high proportion (48% in 2014 with a decrease of 16.4% and 34.9% compared to it in 2010 and 2005, respectively). The proportion of industry and construction was 22%, increased 4.6% and 15.2% in comparison with it in 2010, 2005 versus. The proportion of trade and service is 30%, increased 12% and 19.7% for 2010 and 2005, respectively.

(b) Gross Domestic Product (GDP) in 2010 – 2014 was averagely obtained 12.5%/year, greater thatn it in 2005 – 2010 of 1.96% and reached the highest level upto 2014. Average per capita income was 24.000.000 VND/year.

(c) Growth ratio:

Growth ratio of agriculture in 2010 – 2014 was 9% due to the great growth of livestock and forestry. Growth rate of livestock achieves 12.64% and it of forestry wa 18%.

(d) Agro-forestry and aquaculture proportions

The movement of domestic economic proportion in agriculture since 2005 has rapidly happned in an accordance with the increase of forestry and livestock, resulting in the decrease of farming. In more detail, the movement of agriculture can be mentioned as below:

- The movement of economic proportion in farming

Food production: due to increase of crop season, productive land is also increased in perspective of decrease if farmland. In addtion, the application of better crops enhances productive yield capacity, showing by an increase of 50 quintals/ha in 2010 to 54.0 quitals/ha in 2014. Average per capita food in 2014 is 530kg/cap.yr, higher than that in 2010 of 60 kg/cap.yr and in 2005 of 110kg/cap.yr.

In which:

+ Paddy rice: Area is 515 ha, yield capacity is 54 quintals/ha, total yield is 2.781 tons.

+ Corn: Area is 22 7ha, yield capacity is 55 quintals/ha, total yield is 1,248.5 tons

+ Sweet potato: Area is 72 ha, yield capacity is 72.1 quintals/ha, total yield is 519.5 tons

+ Cassava: Area is 28 ha, yield capacity is 100 quintals/ha, total yield is 280 tons

+ Sugar cane: Area is 25 ha, yield capacity is 460 quintals/ha, total yield is 1,150 tons

+ Nut: Area is 285 ha, yield capacity is 26,88 quintals/ha, total yield is 776.1 tons

+ Vegatable: Area is 102 ha, yield capacity is 85,4 quintals/ha, total yield is 875.4 tons

+ Soy bean: Area is 20 ha, yield capacity is 16.8 quintals/ha, total yield is 33.6 tons

For paddy rice production: there were some movements in rice variety, contributed to rice yield capacity over an unit of area. This movement enhanced many effecent production types. Long term industrial tree as artemesia was planted, with an increase of 16.9 ha in 2014.

Short term plants were nut, soy bean and sugar cane. The area of these plants was stayed stablely and due to intensive cultivation consideration and application of advanced tachnologies, the yields was 3,8 times higher in 2014 when compared to 2010.

- *Forestry area*

  Forestry productive value in 2014 was 6,412 billions, with an average increase of 14,3% compared to it in 2005-2010. The area of centralized forest was 95 ha (in 2014) and it was expanded the cover ratio of forest of 60% compared to 2007. Forest is protected, exploitated in plan. This is the good sign, as considered as the benefit source for local people in the subproject area.

- *Others*

Additionally, in An Binh commune, some industries, small industries such as brick production, conveying service, other servies..... However, due to the mountainous topography and some difficulties of capital as well as productive technologies, these economic branches are still in young development.

In conclusion, agro-foresty is still the major activities of this area. However, agriculture is exiting some limitations in terms of crop yields, livestock performance. The movement of crop and livestock proportion are facing to difficulties because of different causes, i.e. incomplete irrigation system, the lack of water usage in irrigation activities.

The commune development orientation

Agro-Forest, aquaculture:

- Changing strongly the mechnism of development of the agro-forest production, focusing on the seed, capital and on the application of the science-technology progress; besides, incoporating the productions with the processing the valuable products toward the open market; encouraging the industrial and comercial crops, fruit crops which have high economic value and easily consumed.

- Encouraging the farm economic, creating the new jobs, therefore increasing the local income as well as the land usage efficiency

- Facilitating the husbandry development, aquaculture and continuing the protection and relevant exploitation of the forest.

Industry and small industries

- Enhancing the development of the industrial cluster, expecially the food processing industries
- Facilitating the small industries, giving them priorities, and credit is more favorable
- Enhancing the build of the transportation network as well as the infrstructure in order to serve the development of the socio-economic in the subproject region.

Trade, services and tourism

- Encouraging the development of commodity diversification within the subproject area, enlarging the good circulation as well as improvement of the market system in order to facilitating the product consumption.
- Investing in the activities of the hotel, resturant services; organizing the traditional festivals in order to attracting the visitors, therefore, creating more jobs and more incomes for the locals.

4.3.3 Socio-culture

4.3.3.1 Health and Medicine

The health care station of An Binh commune is located in Cho Dap village - the centre of the commune having the total area of 1250 m2. Up to now the extended vaccination program for the target people within the subproject region has been succeeded. Besides, the programes on HIV/AIDS protection, on food security and hygiene, or iodine supplementation campain have been succeeded.

The health care for the people within the subproject region need to be paid great attention. According to the report written by An Binh commune health centre, there have been 6294 people being examined totally and given the relevant medicine in 2014. The on-serviceand out-service patients in 2014 were at about 90 and 206 respectivelly. Therefore the health centre of An Binh commune were ranked in a good class in 2014.

The number of people who are participating the health insuarance every year take the high percentage, but the vulnerable people such as the minority, the Poor should be paid much attention.

Health condition and health care: Through the results of the survey in Jannuary 2015, the rate of the illness people who were interviewed is rather low, at about 10%. However, according to the latest report of the commune, within 5 recent years, there have been 10 cancer cases per year, focussing on the stomache anf liver cancer. The reason is understood due to too much alcohol drink. Therefore, the familes which have the cancer prone people have to pay a considerable amount of money. This is one of the main reasons causing the difficulties for these families.

4.3.3.2. Education

About 94.6% of the population in the project area graduate from primary school level to university/colledge level and higher education level; in which the number graduating from secondary school and higher secondary school takes 64.6%. The proportion graduating from colledge/university or intermediate level takes 5.5%. This is a very low rate of educated level comparing to the whole Hoa Binh province. The proportion of illiteracy people is 0.2% and

proportion of people who have not gone to school is 5.2%. The proportion of pre-school people from the sub-project region (5.2%) is lower than the one said in statistical yearbook 2013. This ration has no big difference between villages. The noticeable thing is the proportion of illiteracy of minority people is very low which is only 0.5% (this number lies on people over 60 ages). According to living standard classification, proportion of illiteracy people of lowest income (group 1) takes 0.9%.

Table 4-16: Education level of family members (%)

	Highest education level							
	Illiteracy	Primary	Secondary	High school	Intermediate/vocational training	College /university	Preschool	Unknown
Total Sample	**0.2**	**24.5**	**39**	**25.6**	**4.8**	**0.7**	**5.2**	**0.0**
Villages								
Duc Binh	0	26.5	33.7	28.7	5.2	1.2	4.7	0.0
Dai Dong	0.9	25.1	43.4	21.5	3.7	0	5.4	
Dai Thang	0	18.7	40.7	28.8	4.4	0.2	7.2	0.0
Thang Loi	0	26.8	38	24.8	5.5	0.5	4.4	
Peoples								
Minority People	**0.5**	**19.4**	**44.4**	**24.5**	**4.1**	**0.5**	**6.6**	0.0
Kinh	0	27	33.5	28.3	5.4	1.2	4.6	0.0
Income								
Group 1 (poorest)	0.9	38.3	42.5	9.8	2	0	6.5	0.0
Group 2	0.	25.9	39.7	23.1	5.7	0	5.6	
Group 3	0	24.2	37.8	27.1	6.2	0	4.7	
Group 4	0.	15.2	37.8	34.5	6.2	1.2	5.1	0.0
Group 5 (richest)	0	11.8	34.1	42.6	7.2	0	4.3	0,0

There is no case that leaves school early in four villages in the total samples under investigation.

4.3.3.3. Health

Statistics have shown that there are up to 30.2 % of the investigated household in the past 12 months has illness people (see table 4-17). This is not a high rate. The proportion of medical insurance in this region is pretty high, takes 90.5 %. This is due to the national policy of free fee of medical insurance member card delivery for poor and close to poor people, the households from minority peoples and people have special difficulty. However, qualitative study shows that the level that people use medical insurance member card is not absolutely utilized; many of them do use medical insurance card, especially people at the labor ages. There is not big difference on illness situation between villages, between Kinh people and investigated Ethnic minority

Table 4-17: Health condition and health care

	Illness people over 1 month	Having medical insurance card
Total samples	30.2	90.5
Villages		
Duc Binh	28.3	90.2
Thang Loi	33.2	91.1
Dai Thang	30.1	87.2
Dai Dong	31.4	92.1
According to minority peoples		
Kinh	29.3	90
Minority peoples	31.2	91

Besides investigation, group discussion between social experts and community make the health care situation deeply consulted. Over recent 5 years, there are 10 cases of cancer diseases every year, viz. stomach and liver cancer. The reason is due to the habit of drinking alcohol and the second reason is due to impure drinking water source; all household uses drilled well water source for drinking water. In fact, household which has cancer patient has to pay several hundred million VN dong for cure; hence they bankrupt and become poor household.

According to residential people, the main reason which is negatively affected to the health situation is the lack of domestic water source; people have to use drilled well water which is not sure to be safe. Social consultants combined with environmental consultant have planned to investigate underground water samples in SUB-PROJECT region.

Besides, the costs indicator for health of people is considered. The cost indicator for health care of people is an important indicator which represents how concerned people take care of their health. Statistics shows that up to 51.3 % of people spends nothing for health care and curing. The remains distribute evenly to people spending from under 1million VND to 1-3 million VND, 3-7 million VND, 10-20 million VND and over 20 million VND. Households which spend over 20 million VND are the having-cancer-patient household.

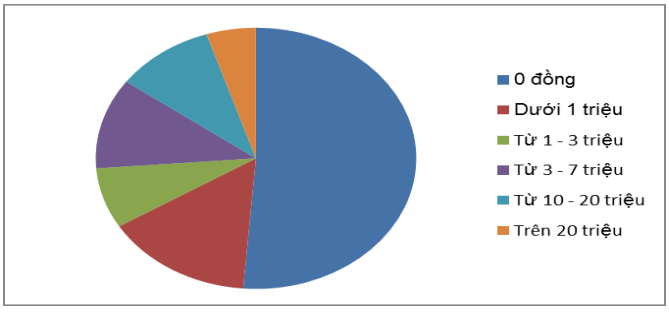

Figure 4-5: Costs for health care

4.3.3.4. Infrastructures

The sub-project region located on An Binh commune with current infrastructures as followed:

a) Public works

* *The status of the working office:*Working office of the Comunist Party, People Council, People Comittee of the commune

- Area of the working office: 2475 m2
- Including 2-story-building of 480 m2 which is degraded, 1 cultural house of commune having an area of 400 m^2 and 1 parking house of 100 m^2.

** School*

+ Kindergarten:

- The whole commune has 2 A kindergartens of 4.130 m2 with headquarter located on Cho Dap village and classes distributed to other villages: Thang Loi, Cay Ruong, Dai Dong, Duc Binh, Dai Thang.
- The total class-rooms are 21 rooms, in which the Middle school has 6 class-rooms.

+ Primary school

Primary school A (standardized)

- The middle area: 7.608 m^2, 15 class rooms
- Duc Binh village: 200 m^2, 1 class room
- Cay Ruong village: 200 m2, 1 class room

Primary school B (have not standardized): Area 4.332 m^2, 9 class rooms

+ Secondary school:

Located on Cho Dap village with area: 8.231 m^2

Class room: 2-story-building, 18 class rooms with fair quality

Functional class room: 1 class room

This school is national standardized.

** Health centers*

- Health centers at Cho Dap village: The total area is 1250 m^2 which is firmly constructed.

* Market

- The market of the commune lies in the provincial highway 438 of Cho Dap village with area of 4200 m2; including 1 market and 4 kiosks.

b) Transportation and hydraulic irigation

Irigation:

- Curently there are 5 pumping stations, 15 reservoirs and 3 weirs serving for irrigation and draining and daily life for people. However at the sub-project region,in 3 villages viz. Dai Thang, Dai Dong, Thang Loi there is only one water source extracted from Dai Thang reservoir

Table 4-18: Status of channels, trenches at the sub-project regions

No.	Villages. channel. trenches route	Chanel route	Start point	End Point	Length (km)	In which	
						Lined channel (km)	Un-lined channel (km)
Total					***56.2***	***10.0***	***46.2***
1	**Duc Binh**				**2.5**		**2.5**
		Main channel	From Goc Da weir	cemetery	2		2
		Branch channel	From crossing roads	Hung house	0.5		0.5
3	**Dai Dong**				**3.5**	**0.9**	**2.6**
		Main channel	Ong Thao gate	2 du field	0.8	0.3	0.5
		Main channel. route 2	Cai Can	Ong Tanh field	0.6	0.6	
		Branch channel 1	Ao Khe	Ong Hop field	0.6		0.6
		Branch 2	Ao Khe	Cai Duong field	0.4		0.4
		Branch 3	Ong Thao gate	Dong Xay	0.4		0.4
		Branch 4	Dai Thang cemetery	Mrs Then gate	0.3		0.3
		Branch 5	Ong Thao	Dong Xay	0.4		0.4
4	**Dai Thang**				**2.8**		**2.8**
		Main channel	Head works	On Than House	1.3		1.3
		Branch channel 1	Ong Hiep house	Roc BU	0.2		0.2
		Branch channel 2	Ong Dung	On Ry house	0.9		0.9
		Branch channel 3	Village centre	Square lagoon	0.4		0.4
5	**Thang Loi**				**2.3**	**1**	**1.3**
		Main channel	From Dai Thang	Ruc lagoon	1	1	
		Main channel	O Ban door	Ong Thoa house	0.3		0.3
		Branch channel 1	Room garden	Cai Ne	0.2		0.2
		Branch channel 2	Room garden	Buc Chua	0.1		0.1
		Branch channel 3	Cai Bum	Dong Cao	0.5		0.5
		Branch channel 4	Cai Bum	Dong Nhat	0.2		0.2

**** Electricity:***

100 % of residential people living in the sub-project region as well as the whole commune use electricity.

Electricity network

The current electricity network on the whole commune includes:

- 35 KV input: The total length is 8,9 km (8,1 km satisfactory)
- 0.4 KV input: Type of electric wire AV 4x50, length 52 km (10.6km satisfactory)
- Lighting network 0.4 KV: not yet

In implementation process of subproject, electricity can be supplied from 2 in 10 electric stations (1 is in used and 1 is in spare) and connected with grid-line.

*** Cultural house, sports complex of villages, communes**

Table 4-19: Status of cultural house and sport complex of villages, communes

No.	Name of structures *(cultural house)*	Units (m2)	Cultural house				Sports complex			
			Satisfactory (Y/N)	Need to upgrade	Need to renew	Material of shortage (book board, tables, chairs)	Satisfactory (Y/N)	Need to upgrade	Need to renew	Device of shortage (sports instruments)
I	**Commune**	**400**	Y			Shortage	N	X		Shortage
1	Duc Binh				1		N		X	
2	Dai Dong	70					Y			Shortage
3	Dai Thang	70	Y			Shortage	N	X		Shortage
4	Thang Loi	70	Y	x		Shortage	N	X		Shortage

* Post officice:

- Cultural post office of commune was constructed at Cho Dap village with the following scale:

+ Area: 140 m2

+ Structures: 4th grade house, area 60 m2

+ Quality: good, serving for demand of people

- Need to be connected with internet and invested in publications and books, stories.

4.3.3.4. Tangible and intangible cultural properties

According to investigation as well as community consultant, An Binh commune in general and Sub-project region in particular do not have historical area, archaeological sites or other cultural regions. Although the Muong minority in the commune and 4 villages in the sub-project region takes up a high proportion, there are not many cultural festivals in the commune. Sequently, the cultural life here is poor; cultural festivals with cultural features from minority people (Muong peoples) are not organized.

Some backward customs from Muong peoples such as letting dead people inside the house or wedding challenge (dangerous challenges from bride sides) have been removed for long time; 100% of households lead a new cultural life. The people hope to recover beautiful customs and construct spiritual and cultural structures to improve life quality.

4.3.3.5. The minority peoples

In four villages belonging to the sub-project regions, there are up to 71% of people are minority people (Muong people); only 4 households have sons or daughters which is got marries with Thai minority although they still live with maternal parents who is Muong

people. Hence, households which get benefits or negatively affected by the sub-project implemetation are mainly Kinh and Muong people...

*About households scale:*According to investigated data the scale of Kinh people's household is less than the minority people's: the medium size of Kinh peoples is 3.9 in comparison to the minority people is 4.1. In general, the scale of Muong family is larger than Kinh family; the percentage of Kinh family which has from more than 5 people is 29.6% and this percentage in Muong people is 39,6%.

About career: The proportion of Kinh households which make living by agriculture-forestry-aquaculture is lower than the one of Muong people (52% and 53.6%). However, the results of investigation from Muong people at the sub-project region show that there have not occurred handicraft industry amongst this community. Meanwhile, the percentage of Kinh peoples take part in this field is 2.6%. The group of people who lose the ability to work takes 4,6% in the minority people, 4.2% higher than Kinh people. This is burden and difficulty for the economic development of community.

About education The illiteracy proportion amongst Muong minority is visible. This ratio focuses on old people who do not have ability to study. For the remained entity, there are not many big differences between the 2 peoples. However, the percentage of better education level (secondary, high school level, colledge/university) of Kinh peoples takes up the dominant part.

Health Between Kinh and the minority peoples there have not many differences in the illness and diseases situation over the last month; the percentage of people having been insured by medical insurance member cardis more than 90%. This is a high rate comparing to other regions. This is because of the supporting policy and health care from commune and province which always concerns about health and living conditions of the minority.

Hygiene There is difference between Kinh and Muong peoples in the number of latrines and sanitary latrines. In the investigated samples, there are 6.3% of minority households which do not have latrines. However, they do not defecate on pond or streams; they come to parents' or brother's or sister's for toilet

Living standard There is not any considerable difference in the living standard of the minority peoples and Kinh peoples when they self assess. The poverty index of Kinh is lower than the one of the minority (10.4% and 9.2%). The richness index of Kinh is higher than the one of Muong (3.7% and 2.1% respectively). However, this difference is not considerable; hence in the sub-project region it is not cleary different between Kinh and Muong peoples.

The minority households in An Binh commune in particular and in the sub-project region in general meet difficulties in domestic water and production water. Due to 3 villages in the downstream viz. Thang Loi, Dai Thang, Dai Dong get benefits from the sub-project implementation. However, during construction there is a season when water is diverted and agriculture activities of the minority will be influenced. The problems relating to the level of influence and the plan to support for people will be detailed in an independent report Plan for ethics minority development.

4.3.4. Gender Issue

In this report definition on laborious assignment according to gender will be analyzed. This definition consider different assignments and responsibility between male and female, who works, when, how, how long, etc. and the social recognition on labor. The activities assignment based on the awareness of all community/social members.

Besides this report indicates that the responsibility on family works which is taken by women is called "burden on 3 shoulders of women". The burden on 3 shoulders of women contains the work which is paid at office, the work which is not paid such as the role as reproduction – mother, the work for family (after office time). The production work is the one that provide products, service for consumption in the family or create income. The reproduction work is giving birth, children care, and housework and maintain family life. The community work is providing and maintain the resource such as water utilization, health care, education, leading. Male has the tendency to take part into community and production.[1]

Employment issues are the first information which demonstrates the position and role of women in the family and in the society. In 4 villages affected by the project, there are not many women taking over the position as village leader, president, secretary and important positions in the community; 100% is male except women union. Female employment work in the field, and male employment usually has work with higher salary than female. Female often takes part in hiring and farming, and male takes part in agriculture-forestry-aquaculture and construction industry. Over 71.43 % is the percentage for women doing housework. Thereby, this shows a picture of women usually having low income. When being interviewed, almost all women suppose that their husbands make decision to invest in production and important work and women mainly raise children and do housekeeping.

Table 4-20: Tasks assignment in households in the sub-project regions

Production activities	**Both genders (%)**	**Male (%)**	**Female (%)**
Cultivation (rice, other crops)	85.72	8.57	5,71
Husbandry	92.85	5.71	1.44
Afforest ration/forest care/forest protection	57.14	35.71	7.15
Exploitation of forest products	50	35.71	14.29
Fishing and aquaculture	57.14	14.28	28.57
Worker/employee	42.86	50	7.14
Business/trade	35.71	21,43	42.86
Work away from home (not often at home)	21.43	71.43	7.14
Family activity			
Child care	64.29	7.14	28.57
Housekeeping	28.57	0	71.43
Cooking/housewife	22.86	0	77.14
Taking part in community work	**Both genders (%)**	**Male (%)**	**Female (%)**
Join in community meetings	85.71	10	4.29
Join in production training	71.42	14.29	14.29

Production activities	**Both genders (%)**	**Male (%)**	**Female (%)**
Social and political organization activities	78.57	21.43	0
Decision making			
Making decision on family expenses (shopping on valuable asset, wedding)	92.86	7.14	0
Making decision on children's study and career	57.14	35.71	7.15
Decision on investment and production	71.43	22.86	5.71

(Source: Investigated data)

From results of Table 4-20

- For production activities: cultivation (rice, crops planting); husbandry, afforestry/forest care; exploitation of forest products, worker/employee and aquaculture, both 2 genders male and female take up a dominant part. The activity which makes more than 85% is cultivation and husbandry.. Work away from home activity mainly concentrates on male (over 71.43%)

- For family activities: women do most of the work as children care, housekeeping, house works. The housekeeping, cooking/house works take over 71.43%, the household from beneficial region takes 64.29% in sharing the work of child care. This is a time-consuming work for women.

- Taking part in community activities: both genders mainly take part in this activity, concretely, join in community meeting (85.71%); join in production training (71.42%); social-political organization activities (78.57%).

- Taking part in decision making: most of the households agree that both gender make decision. Decisions on large family expenses (valuable properties purchase, wedding) take 92.86%; decisions on study and career of children take (57.14%) and decisions on investment and production take 71.43%.

In general, this is due to cultural features and traditional properties of Viet Nam; for instance women often produce small business and work in agricultural sector such as processing; and other industries such as exploitation is undertaken by male; the other reason is due to the limited awareness of gender equality. In addition to participating in family income, women also have to take care of the family; hence they lack of time of taking rest, leisure and taking part in social activities, as well as the opportunity to take part in training and upgrading the ability. This restricts the ability to access to advanced technology and to contribute to development goals. Hence, without timing and reasonable support the chance for development of women is lower than men. To sustain in this competition, it is required both female and male to improve their knowledge, skills, and determination. If an individual or a certain gender starts at a lower position, and has less time and opportunity to invest to study the risk of failure for them or for that gender would be higher. Therefore in order to improve the contribution of women, chances for access and getting benefit from activities of dam safety and rehabilitation program must be uniform for both 2 genders. In these activities, it should be performed in the most favourable way for women's participation

It can be said that both sexes highly appreciate the role of water resources and wish

to have enough water to reduce working time. This data represents the contribution of female and male in production and employment; this indicates the degree of equality and responsibility of each gender in the project area.

PART V: ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT

5.1. Environmental social screening for subproject

5.1.1. Environmental and social impacts screening

Results of envrionmental and social screening of this subproject is provided in Table 4.1 – Appendix A4 and results of environmental – social impact screening is provided in table 4.2 – Appendix A4. Based on these results, some comments can be given as followings:

In general, potential environmental social impacts of this subproject are ate the low or average levels and temporary. However, impacts on air environment are predicted at the high level (specially in construction phase) and temporary.

According to this list, subproject of "Rehabilitation and improvement of Dai Thang Reservoir", ti requires to submit below reports:

- Environmental and social impacts assessment (including annexes).
- Resettlement Action Plan report
- Dam Safety report
- Ethnic Minority Development Plan

5.1.2. Ethnic minority screening

As part of the social assessment, where ethnic minority (EM) peoples are present in the subproject area–as confirmed by the EM screening (as per Bank's OP 4.10), consultation with them were carried out in a free, prior, and informed manner, to confirm if there is broad community support from affected EM peoples for the subproject implementation. EM screening was conducted as per Bank's OP 4.10, and was done the scope and coverage of the social assessment vis-à-vis (as 4.01) the environmental assessment as follows:

- Beneficial areas of the Sub-Project: Thang Loi, Dai Dong, Dai Thang villages
- Affected areas of the Sub-Project:
  + Due to land acquisition and construction: Duc Binh village
  + Due to water cut-off for dam rehabilitation: Thang Loi, Dai Dong, Dai Thang villages. 90 % of affected households are Muong people. 244 households will be influenced when the water cut off during the period of the water intake repairation in which the minority people (Muong) takes 223 households; The area of 571,297 m^2 of the paddy rice will be encountered the water shortage within 2 to 6 months in which the area belongs to the Muong people takes 535,711 m^2

The consulting agency has carried out ethnic minorities screening freely, they were well informed and given necessary information in an appropriate way (FPIC). So that affected ethnic people in 3 villages will be supported.

Base on the results of social assessment and consultation. Therefor, it need to prepare a ethenic minority development plan for this sub-project.

5.2. Potential positive environmental social impacts of subproject

The implementation of this subproject is predicted to bring some positive impacts as:

Environmental impacts: When work items are repaired and upgraded, the capacity of Dai thang Reservoir will be increased, the headwork system will work more stable. In addition, the flow will be regulated in the rainy season and supplement water in dry season, allow to stabilze and diverse aquatic system in Reservoir. With a large quantity of water, water quality will be improved and supply water use for local people in An Binh commune.

Socio-economic impacts: The project will bring many benefits to the people, namely increased productivity and agricultural output, increased services, aquaculture development through enhanced irrigated area, reducing disaster risks. The work after the construction will ensure irrigation stability for 130 hectares of rice and vegetables through the year for households; Providing water for 15ha aquaculture and Restriction of negative impacts on the environment, landscape and downstream reservoir. Increase production and non-agricultural business thanks to agriculture development , increase income and improve living standards. Creating more jobs, especially for the group whose hired job is considered as the main occupation or sideline, reduce harvest time and contribute to poverty reduction.

The positive impact includes large parts of disadvantaged groups benefit. Those people who have production land benefited directly by irrigation.

The investment, strengthening, improvement and modernization of Dai Thang Reservoir will gradually contribute to improve infrastructure, improve the living conditions difficult in minority areas downstream.

5.3. Positive negative environmental social impact of subproject

5.3.1. The historical negative impacts and mitigation action

a. The incidents in history

Historically, at the complex reservoir Dai Thang there were 3 incidents, namely as follows:

- In 1978: local flooding occurred within 1-2 days due to heavy rain. According to the survey, the flood do not cause damage to people, no statistical impact on crops.

- In 1986: historic flood, the water level reached from 60-80 cm, while flooding time from 2 - 3 days, directly affecting 3 households in Duc Binh commune (located behind the spill). At the time of the flood occurrence, the fish lake so when the water level exceeded the peak spill, discharging downstream, local people rushed to fish. Due to the massive discharge of water behind spills which affected the downstream rice area cultivation area. However, at that time, there was no statistics affected by the flood about such rice area.

- In 1996: there was a flood due to extremely heavy rain, but the spill exceeding level was not so great, time for water drain out after 12 hours. No loss of people and property.

b. The impact on the environment and society

The historical incidents happened in 1978, 1986 and 1996 did not cause any damage to people, only influence on agricultural production (no specific statistics). Notably, the number of fish raised by farmers from surface water bid in the lake was washed away due to the occurrence of spills; years later, people continued to fish annually pay a certain fee for Mining Company Limited irrigation works Lac Thuy district. However, to the present time, due to the amount of food in the lake is limited resulting poor productivity.

For the environment, this incident had impacts on local surface water, namely unclean water in the pool with so much sediment, local impacts to ecosystems in the lake.

c. These taken repair measures

Even when there was a problem, the CPC and the government has taken temporarily reinforced measures to dam surface and spill by carrying sacks, sand, stone block applied on the dam to minimize downstream flood discharge .

d. These outstanding problems

Spill of soil texture is not permanent which is easy to spill in case of any problems occurrence, water overflowing shall wash away much sediment entrainment, reducing function of the energy dissipation .In the dam abutments, there appear more termites, affecting the work quality.

The current status of work items of reservoir Dai Thang as follows:

Management Road: Management roads from communal roads to the dam crest and surface has a length of 110 m is currently soil lines. Rough road surface, path from downstream become eroded as in rain, not convenient for travel and management.

Reservoir: The reservoir sediment reaches about 10 -: - 15% capacity, caused by two hillsides in reservoir bed area is arable land of the people going down to the lake bed.

Soil dams: Dam crest: According to current standards crest width is not appropriate for grade II building of 10 meters, soil da has become degraded, left shoulder of dam surface got eroded and impounded, which has had the influencess on dam safety, difficulties in the management and operation of the dam during the rainy season. Therefore, it's necessary to take measures to reinforce the dam for safety and advantages for travel and management.

Dam face:Dam upstream slope made of soil without reinforced roof favorable for much growing plants;

Flood overflow: The soil spill without reinforcement, spill or energy dissipation. When flooding does not guarantee the safety of people in downstream area. Drain water: Current sewers work normally, but the operation of sewer is hard due to no working bridgetowards to operate the drain.

5.3.2. Impacts during pre-construction phase

5.3.2.1. Activities

Still the project is not constructed, but in the preparatory phase, we could see some major activities of the Subproject has an impacts on the natural and socio-economic including:

- The luminescent, leveling and clearance

- Transportation of raw materials, soil disposal by truck.

Affected subjects and areas

- People are assigned forest land every year and local people engaged in agriculture (annual crops) within the occupied land: the impact on the average, without long-term impact. The area of land for the construction clue is 40 150 m^2, flood overflow is 5810m^2 and the managing house is 500m^2 occupied from this agricultural - forestry land.

- Workers engaged in luminescence: disturbed by noise and dust.

- Biological environmental: terrestrial flora. The degree of impact on reducing forest cover.

- Social environment: 12 households are recovered agriculture and forestry land, reducing the per capita income of the families.

Level of impact: The impact is only partial and minor impacts.

5.3.2.2. Source of impacts

- Dust and noise from machinery used to cut trees.

- Development of waste from machinery (oil) and from construction workers (garbage, solid waste).

- The luminescent forests for land use and long-term temporary

5.3.2.3. The social impact in the preparation phase of Subproject

The socio-economic impacts

In the preparation phase clearance, environmental impact assessment task must identify the negative impact to the living conditions of the people from which make out remedies, reasonable mitigation. For this project, at this stage the impacts on socio-economic environment take place mainly in the reservoir area

Subproject repair and improve Dai Thang reservoir dam safety was conducted on An Binh commune, Lac Thuy district, Hoa Binh province. The conduct of the construction project will have long term impacts over 15.935 m2 of residential land, agricultural land and forest land of 12 households in the village Duc Binh, including 01 affected household in the area of residential land , buildings and structures located on residential land.

In total of 12 affected households there are 45 persons at the rate of 51.1% male and 48.9% female. All the affected persons out of 12 households are all Kinh, without any ethnic minority. Age group of people are affected as follows:

- Under 18 years with 11 or 24.4% percentage;

- From 18 to 60 years old with 29, or a percentage of 64.4%, this is the age of the largest affected percentage and still in working age;

- Over 60 years with 5, or 11.1% percentage.

The majority of people affected are married, the proportion of people affected with wife / husband is 26 persons or of 57.8% percentage, followed by some singles with 15 ones or a percentage of 33.3% and 3 widows equivalent to a percentage of 6.7% due to thier old age, in total 45 people affected there are no cases of separation or divorce.

On the literavy level of 45 people affected there is no illiterate subject; 6 persons finished primary school program accounting for 13.3%; 23 of junior high school accounted for 51.1% percent, this is the highest rate in all literacy level of of the people affected. There are 8 finishing high school accounted for 17.8% percent. The number of vocational schoolsis 1 person making up 2.2%; those of the college / university are 2 personsaccounting for 4.4% and the number of children under school age is 4, or a percentage of 8.9%.

Overall, the literal level of the affected households is relatively high compared to the average of the local, this will be more favorable in the economic development of the households especially for the application of scientific progress techniques to production and professional career change of those whose production land is affected.

The impact on the lives, psychology of local communities: Through project analysis, it's shown that in the preparatory stage only a part of the community has lost thier land. This group is the Kinh community, the state's cultivation land acquisition and disposition of production area to prepare for the clearance will not greatly affect farming practices. The only impact of the project during this period is the impact on the livelihoods and income, which can have certain impacts on the life, the psychology of the people affected.

Because of small acquisited area,this is considered to betrivial impact.

Impacts on safety of dismantling workers and communities:

- Risk of electric shock during site clearance can cause fire and smoke, dust, hazardous debris, be dangerous for workers and residents.
- Material falling during dismantling process can cause accidents.
- Transportation of bulk materials can be easy to make accidents, especially for the section having the relatively high traffic density or being near schools.
- The process of demolition, site clearance, excavation may reveal toxic substances that were previously buried or hazardous substances in new waste and can directly affect health of workers and residents.

Affecting transport, infrastructure of the local: When commencing clearance, vehicles in the project area increased affecting the local roads system. However the small amount of vehicles in clearance phase doesn't have much influence on infrastructure;

Thanks to the small number of directedly affected households, only one affected household regarding their residential land, so the level of impact on culture, society is very low.

5.3.2.4. Impacts on environment

5.3.2.4.1. Leveling

a. Source of impacts related to waste

**** Sources of wastewater***

Due to the leveling operation is usually carried out in a short time (1-2 weeks), the amount of sewage workers do not arise not so much. Wastewater during equipment washing process

accounts for only small amount of about 0.5 - 1m3 / day. night is negligible amounts and without any impact on the environment.

**** Source of solid waste***

In the leveling phase, only a handful of skilled engineers about 3 to 4 people with machines operating mainly. The principal activity during this period was leveling in preparation for the construction phase. Thus, the volume and composition of solid waste generated only about 4 * 0.5 = 2 kg of garbage / day.night, short period of 4-5 days should trash about 8-10kg, weighing not more so Environmental impact is negligible.

**** Source of emissions***

When conducting field surveys, machinery used for grading, diesel engine running also releases toxic gases such as (SO2, NOx, CO2), polluting the local atmosphere however only affect workers not residential location for drilling locations are in the forest and agriculture land, so the gas generated was diluted and without accumulation.

b. Source impacts related to waste

Noise generated while bulldozers leveling operation stones cause noise pollution and environmental impact. However, due to the use of machinery for leveling can affect soil and the impacts on the groundwater resource in the area.

5.3.2.4.3. Prepare materials and camps for subproject

Materials for Soilembankment: including includes embankment dams, embankment offset pit and the cofferdam. Embankment dams have good quality, ensure proper compaction density and the design so it should be chosen carefully. embankment offset pit and the cofferdam required by strict quality selection can be taken from rock excavation .

Dam embankment material is taken at the left hillside located at Dai Thang Lake, a mine distance of approximately 400m from dam route, mine storage is 50,000m3, meeting needs. The laboratory indicators of land mines ensure require ments of damming materials.

Stone paving materials: this material is quite plentiful in the project area, was purchased at the quarry works about 20km.

Sand: In the area, there are only small streams so it's hard to exploit the sand, sand must be bought from the center of Lac Thuy districtmoved into work, transport distances to work is around 20km.

Materials for concrete, cement, iron and steel: Bought at the Lac Thuy district center moved to works, transport distance to work of about 20km.

Premises camps, warehouses are located downstream of the dam near the road construction management combined. Warehouse camps are arranged into 2 main areas.

The first zone is located close to the inter-communal village of An Binh commune, construction road to the dam. The headoffice of project management and consulting unit, contractors steering committee, the factory and warehouse to serve the construction of earth dams for water and sewer, at an average altitude of +35mwill be located here.

The second zone is next flood spill supporting the spill execution, the average altitude of about + 37,64m.

The location selectionof materials dumps, camps of the workers should be reasonably arranged (the empty lot,, the location hard tocultivate ...) combined with appropriate treatment measures (share the toilet with the management or portable toilets, contracted garbage

collection, dig sewage collection system ...) will significantly reduce the negative effects on the environment .

**** Impacts from wastewater:*** During this period, sources mainly are from daily activities of the workers looking after the camp supplies, 5 people would have approximate amount of waste: 80 liters / person.day* 80% * 5 = 320 liters / person.day

**** Impacts from solid waste:*** Mainly arising from the waste amount of workers, estimated to average of about: **5 * 0.5 = 2.5kg waste / day**

**** Impacts from dust:*** Due to leveling, there require vehicles and machinery construction activities in the project area. Therefore, to prepare camps for workers, the number of vehicles transporting raw materials, fuel and machinery from outside and for leveling are requested. It is the source of dust and some gases (SO2, NOx, CO2). Transport distance of raw materials for the construction phase is quite long, about 20km.

**** Impacts from trucks' loading:*** In the process of transporting materials togathering place for the project, use heavy trucks from 7 - 10T will cause subsidence of inter-village road (which is concrete road only).

Subjects affected and the impact level:

- Water environment: receiving wastewater from the process of preparing the materials and human activity. The level of impact is small due to the small wastewater flow generated. Shallow groundwater is affected by the operation of vehicles transporting materials.

- Air environment: Receive dust and emissions from the transport of materials along the route from Chi Ne town to the subproject area. However, due to environmental air quality here is assessed as good, therefore, according to the preliminary assessment; the impact can be considered small.

- Soil environment: The gathering of rock, cement and other building materials in the project preparation phase can alter the physical properties of the soil environment in the project area as increased compression, reduced fertility and mineral amount.

- Life of people: The materials gathering especially the construction phase will extend full obstructing traffic and daily life of the people, because of the close inter-communal roads and local roads in the village. It's possible to create convenience and comfort of the people in the project area during construction.

5.3.3.Impacts in the construction phase of Sub-project

5.3.3.1. Activities

In the process of project construction, we can define the impacts on natural environment and socio-economy as follows (see Table 5.1).

Table 5-1: Environmental and social impacts in the construction phase of Sub-project

STT	Activities	Impacts sources
1	Improving ground: excavation and embankment, grading, compaction	-Truck transporting materials, cement, sand, rock, etc create dust and exhaust gases. - Generate the noise from the loading and unloading of materials.

		Dust and emissions arising from the process of renovating premises.
2	Reinforcing spill structure, water sewer and building new managing house	- The construction using heavy machinery for excavation, embankment, reinforcing structural overflow, water sewer and building managing house. These machines cause air, soil and water pollution when releasing dust, grease, etc. - Air pollution from the use of building materials.
3	Living activities of workers at the site	Living activities of workers at the site cause the domestic solid waste, waste water in one day.
4	Completing, cleaning premises, refunding ground, camps, warehouses	Waste from construction materials leftover after construction, waste from camp (the daily activitie of the workers).

Although, according to the overall assessment of project impacts on the people is low, and the environmental impact of the project is mainly related to the effects of air environment .. The worksperformed during project construction course within the areas affected by the sub-project in 7 months (from November to May), it will not affect flood, or flow to the area. According to preliminary assessment, construction position is not in the restricted or sensitive areas.

**** Subjects affected***

- Physics and bioilogy environmental : soil, water, air and ecosystems.

- Socio - economic environment: workers and people on site project areas and vice versa.

**** Level of Impacts***

Construction phase of the project may cause adverse impacts on the environment, but most of these effects are only short-term and temporary.

5.3.3.2. Source impacts

See in Table 5.1.

5.3.3.3. Impacts on social

Land Acquisition, the economic impact on people: Negative impacts of subproject can be indentified such as land acquisition of several households with a total land area of permanent acquisition 15 935 m2 greater than Total land will be permanently revoked (including recovered area for safety dam corridor and dam upgrade and repair of 14 652 m2, overflow area is 1,283 m2). Temporary recovery area to serve the construction is 4438 m2. If the mitigation measures are not applied or not applied well, such compensation is not satisfactory, not support restore livelihoods for farmers whose land is recovered will lead to a risk of the affected parts may face poverty and impoverishment. On the other hand, the increase in agricultural production as crop area expansion and aquaculture will have the risk of water pollution resulting from increase in fertilizers, herbicides and industrial feed.

Land occupied shall affect people in the project area. However occupied area is not large, only 1 household affected residential land. Results of direct consultation at local people showed households to be relocated shall be arranged for a new place, avoiding accommodation stuck.

The noise from cleanup, clearance will affect the fish in the cage cages because the cage positions are close to the roof of upstream dams. In addition, in the construction process, drained reservoir can affect water quality and aquatic species.

The total land area of permanent acquisition is 15 935 m^2 (including recovery area for dam safety corridor and upgrade and repair is 14, 652 m^2, 1283 m^2 area is spill area). Temporary recovery area to serve the construction is 4438 m2.

Total timber trees will be applied ground clearance of 130 trees which are all glue trees from 2-3 years old, with 7,758 m2 rice area of permanently recovery, and an area of 12,578 m^2 rice field affected by one season due to construction of dams causing no irrigation water for production of 571,297 m^2. There are 60 m^2 of level IV houses and 40 m^2 of kitchens equal to level 4 houses affected, in addition, there are 70 m fences, 1 well, 100 m^2 of cement mortar base 75 #, 3cm not colored also affected.

Impacts on the social stability at the locality: Building activities such as soil excavation, filling, clearance for road construction, the site and worker's tents can cause the influence to water supply and agriculture production although there is no major impact on production. Therefore, it should have a reasonable construction method for the agricultural calendar, watering calendar and to arrange a mobile pump station for temporarily supplying water if necessary.

The appearance of the works will promote the best service development in the temporary period, increasing demand for foods in order to serve for the workers. However, the demand for foods from workers should not affect the balance of supply - demand of the region so much. The locality is able to fully meet these needs of the work in all manner.

During the process of construction, it requires to gather a number of workers from other places that may cause a conflict between the workers and local residents. So, a number of workers must comply with the provisions of the law on administration and population management.

Impacts on safety of the workers and community: During the transporttion, rock and soil can be fell on the road. If being collected and cleaned, it would harm to the beautiful looking, be dangerous for human and vehicles, increasing of the accident risks.

Besides the main route linking the towns current activity Chi Ne traffic on main roads remained basically guaranteed. Traffic activities on main roads are secured basically. In addition, the density of traffic on these roads and population density along the road are at the average level, severity of accidents is not high. Therefore, the operation of trucks will not create major problems on traffic accidents. However, the construction unit should still apply the measures to mitigaten traffic accidents.

Subject to regulations, the trucks are allowed to carry overload (7 tonnes) and acceptable speed (30km/h) while on communal roads. The overloaded truck maybe cause damage for the traffic works, leaading traffic accidents.

Domestic wastes from the tents without proper management causes local pollution such as unpleasant smell, attracting the vectors such as flies, mosquitoes, rats,etc affecting to health of workers and the community.

Impacts on culture-society: If the project is implemented and exerted its effectiveness in the coming years such as sufficient water supply for production and improvement of channel surface, over a third of person joining to the survey have planned their production plans. This shows the potential impact of the project on production of the project area. Agricultural production will increase. Therefore, demand for planting more rice and crops is large but it may face to increasing of use of chemical fertilizers and pesticides, leading the risk of environment pollution. On the other hand, the increasing of rice yield will put more pressure on solving the problems after harvest such as processing, preservation as well as consumption in order for farmers to gain more benefits in the value chain of rice.

Social impact on the increasing and transformation of economic activities in conditions of supplying enough water for production demands maybe create more jobs, especially for groups of employees, reduce harvest time and contribute to poverty reduction. However, the project also has negative impacts such as land acquisition and resettlement, livelihood and business impacted by the relocation; conflicts on water use; increasing of use of fertilizers and pesticides; health risk; and impact of ethnic minorities. These impacts need to be considered and reduced the period of project implementation.

Impact on public health: Materials and noise of machinery, etc in addition, whenconstructing, construction workers moved from other areas may also bring pathogens and lifestyle which could break local traditions and regulations. Local project management units need to consider the health risks such as infectious disease through sexual contact, with the propaganda activities, closely monitor this work.

For socio-economicissues, thesub-project will bring positive and long-term impacts. The negative impact is considered negligible and only occurs primarily during construction course.

Increasing traffic density in the project area: During construction, activities of transporting raw materials, machinery and equipment increased traffic density in the area. With the large amount of truck traffic during construction, short transport frequency, long distances (20 km) causinggreat impact on traffic density in the Subprojecr area.

Transport of disposal, machinery, equipment, materials ... in the construction phase can damage roads in the area of the large obstruct the movement of people and risk of accidents.

Building works are carried out mainly on the commune roads which shall greatly affect the activity of the people traveling in the region. So, in the course of construction it's advised to coordinate with the traffic sector to implement traffic control measures closely to minimize the possibility of accidents caused by construction vehicles.

Labor accidents

Labor accidents likely to happen during the construction phase:

- Accidents caused by electrocution

- Accidents caused by falls, pour the material, building structure ...

Construction workers are subject to the risks of occupational accidents. Work in the area of large tonnage machines, power lines ... are the unsafe factors. The extent and frequency of occurrence of occupational accidents will be stronger if the regulations on labor safety are not implemente, the construction vehicles are not regularly maintianed or when construction workers are not trained about the safety measures.

Iimpact on agricultural production: Cutting of water while reinforcing structural spill disrupts water supply capacity for production in downstream areas (in 3 villages: Dai Dong, Thang Loi, Dai Thang). 244 households will be influenced when the water cut off during the period of the water intake repairation; The area of 571,297 m^2 of the paddy rice will be encountered the water shortage within 2 to 6 months.

Impact on Ethnic Minorities: The implementation of the Subproject initially brings a lot of positive impact on the lives of ethnic minorities, and in particular Muong ethnic group. But in the process of implementing subproject, particularly in the construction process there are unavoidable impacts on certain communities in 03 villages: Thang Loi, Dai Thang, and Dai Dong with a rate accounted for more than 90 ethnic minorities %. During the construction process there is no Muong household to be revoked their productive land. However, the construction and repair of the sewer drain, the water cut production is required, so the lack of domestic production in a season affects the lives of so many people here. of which 223 households are from ethnic minorities. With the sole production water source from downstream Dai Thang lake without any additional plans for other temporary water sources.

In addition to the impact of seasonal production water cut, implementation of Subproject will have impacts such as obstructtion to traffic, dust and noise during the construction phase, temporary demolition works, canals water and the dangerous effects due to increased transport can speed up after the project completion. These effects can be completely reduced or eliminated. Therefore, minority Ethinics Development Plan of projects have focused on consultation to ensure that indigenous peoples have the opportunity to raise their concerns and to participate in and benefit from the project. Consultation with them were carried out in a free, prior, and informed manner (FPIC), to confirm if there is broad community support from affected EM peoples for the subproject implementation.

Impact on Gender Equality and Children: During construction, drains repair can cause water cut for a season may be due to dam repair as water scarcity, which will lead to women to use more time for water (as traditional practice and the division of labor by gender).

The area of agricultural land and planting crops to be reduced will have direct impact on incomes of women, this can also be indirect causeof their leaving homeland for life.

In reality, it is shown that children can be at risk due to water. in 2014, at An Binh Commune there were 4 cases of children death drowning. So, there must be policies for child safety and protection of children's rights, children are not allowed to sell goods or services around the lake repairs and upgrades.

Roads will be more difficult and dirtier in rainy season, it can affect a child's psychological concerns to the school and causing children's dropping out of school, so the contractor selected construction plans mainly in dry season. However, these effects are considered small for the time construction is short. Not be regarded as the cumulative effects, long-term damage to local life.

5.3.3.4. Impacts on environment

a. Impacts on water environment

Impact on the water environment in the construction stage includes impacts on surface water and impacts of ground water:

Impacts on surface water:

- Domestic waste water: Domestic wastewater of workers is a major cause affecting to water quality in the surrounding area. Domestic wastewater contains many impurities, easily

decomposable organic matters, nutrients and bacteria so that it can lead to contamination of surface water and groundwater if not untreated. Domestic waste water is generated from the following sources: cooking, washing and normal hygiene of workers and officials.

Based on the pollution coefficient provided by Vietnam Environment & Sustainable Development Institute-VESDEC, the volume of pollutants per person daily released into environment is given in the following table:

Table 5-2: Load of pollutants in domestic waste-water

No.	Analyzed parameters	Average pollution laod generated by pne person per day (g/person/day)	Total maximum pollution load (kg/day)
1	BOD5	45 – 54 (49.5)	10.8
2	COD	85 – 102 (93.5)	20.4
3	TS	170 – 220 (195)	44
4	SS	70 – 145 (107.5)	29
5	Oil	0 – 30 (15)	6
6	Total nitrogen	6 – 12 (9)	2.4
7	Organic nitrogen	2.4 – 4.8 (3.6)	0.96
8	NH4+	3.6 – 7.2 (5.4)	1.44
9	Total phosphorus	0.8 – 4 (2.4)	0.8
10	Total Coliform	106 – 1010 (108) MNP/100ml	-

Source: Report of Vietnam Environmental Science And Development Institute -VESDEC, 2007

Table 5-3: Estimation of pollutants concentration in domestic wastewater

STT	Pollutants	Estimated pollution concentration (mg/l)	QCVN 14:2008/BTNMT	
			Column A x 1.2 (mg/l)	Column B x 1.2 (mg/l)
1	BOD5	250 - 400	36	60
2	COD	400 - 700	-	-
3	SS	300 – 400	600	1200
4	TotalNitrogen	60	-	-
5	Nitơ organic	28	-	-
6	NH4+	36	6	12
7	Total photpho	6.86	7,2	12
8	Total Coliform	108 MPN/100ml	3,6*103 MPN/100ml	6*103 MPN/100ml

Concentrations of pollutants in domestic wastewater (in the case of not being handled) exceeds the largest allowable concentration of pollutants in domestic wastewater under the form of small-scale production of less than 500 people (hence coefficient K for the largest concentration, K = 1.2) in accordance with QCVN 14: 2008- Regulation prescribed the permissible maximum value of pollution parameters in domestic wastewater as being discharged into the environment. In this case, wastewater will make bad influence to drainage

channels of the Project (the place directly receives waste water) if being untreated. The organic compounds are susceptible to decompose by microorganisms, reducing amount of oxygen in the water, affecting respiration of aquatic species. Nutrients such as nitrogen facilitate algae to grow, leading to eutrophication and loss of ecological balance at the receiving water area. To minimize the above impacts, the project manager will provide measures to reduce pollutants in domestic wastewater described in Chapter 6 before being discharged into environment.

Domestic wastewater arises mainly from the living activities of workers in tents located in the area of the site. Basing on demand of water supply under standards of Ministry of Construction (TCXDVN 33-2006), amount of water required for one person to use daily is 80 liters/day, and amount of waste water is 80% (80 liters/person/day). According to the plan of construction and equipment installation in the 2nd drought season (starting from October until the end of April), a number of workers mobilized for the project is 50 people/day, total amount of wastewater per day is about 1.66 m^3/day.

- ***Overflowing rainwater:*** The work is build in the drought season (less rainfall) so the pollution from the overflowing rainwater is negligible.

- ***Construction waste water:*** Impacts on the water environment from construction activites can summarize as follows:

-The process of concrete mixture, sanitary and maintenance of machines will generate a certain amount of waste water, estimated about 0.5 m3/day (Tran Hieu Nhue, water supply - Science and Technics Publishing House, 1996) and is not much. The main contaminated compounds in wastewater are soil and sand classified into the kind of being less toxic and easy to settle, accumulating on the temporary sewer lines. Thus, penetration capacity of pollutants to surface water is at low levels.

Activities such as excavation and embankment towards the mountain donot affect to domestic drainage systems, and potentially affect the turbidity of water in the lake.

Generally, contaminated surface water in the construction is unavoidable in direct or indirect manner but this impact lasts in temporary time. Basing on the extremely high self-cleaning ability of water, especially in the flooding season, water quality will gradually return to its original status after completing the construction activities.

Impacts on Groundwater: The underlying causes affecting the quality of groundwater resources in the construction process, specifically as follows:

- Surface water is the basic source of water supply for groundwater, so the surface water contamination will lead to contamination of the aquifer.

- For the shallow aquifer, earthworks, ground transportation will make the exposed groundwater, surface water and rain water containing contaminants entering groundwater causingpolluted Underground water.

- In addition, the use of heavy machinery, the number of vehicles transporting large loads from 7 - 10T, long distances (20km) also have an impact on the groundwater capillary at shallow underground .

b. Impact on air environment

The impacts on air environmental due to construction course include:

- Dust from the transport and handling of materials (stone, sand, cement, steel, etc) and transportation of waste;

- The dust and gases SO2, NO2, CO, HC exhaust from motor vehicles transporting construction materials;

- Noise arising from the operation of construction equipment (excavators, concrete mixer, means a motor vehicle ...).

* ***The impact of dust pollution sources***: The operations for excavation, soil transportation, construction and expansion of spillway, etc ... and other works require a large number of trucks to transport materials and fuels in or out of the site. Moreover, the risk of waste spillage on the road maybe happen, causing the unsafety for traffic and sanitation and dust generation during the process of soil, sand transportation.

According to preliminary calculations, the total volume materials to be used for construction is soil volume (digging and embankment) + volume of concrete = (73.51+ 69.97) x (1000 m3) x 1.6 T /m3 + 2.27 x 1000m3 x 2.5 T /m3 = 230.441 tonnes

With the amount of material handled in this stage of 230.441tons, the number of vehicles required to transport such material volume of about 23.044 vehicles turns respectively (maximum load vehicles are allowed on the road is 10 tons, using diesel fuel) for a period of 7 months (210 days)

Table 5-4: Traffic flow of material handling in project area

Volume of transport (tons)	Total (vehicles turn)	Time (days)	Traffic flow (vehicles/day)
230441	23044	210	157

Vehicles for transporting and moving the materials are dump trucks. These trucks release amount of dust, including dust from road surface, material spillage and the fuel combustion. According to quick assessment method of WHO, we can predict amount of dust generating from the transportation with the reference assumptions at locality as follows: average speed of 35km/h, average load of 5 tons/truck, average distance of 5km/time, working time of 8h/day.

Table 5-5: Dust load in the process of construction

Source	Coefficient (1000km)	Generated amount of dust from one (kg/1000km)	Generated average load (kg/day)	Generated average load (kg/h)
Material transportation	3.7 × f	1589.81	3849.12	436.14

Source: WHO - Assessment of Sources of Air, Water, and Land Pollution - Vol 1 - Generva 1993.

And:

f: Coefficient of secondary dust generating from operation of trucks on the road calculated by the formula:

$f = v.M^{0,7}.n^{0,5}$

- v: Average speed of truck: 35 (km/h).
- M: Average load of truck: 5 (ton).
- n: Average number of wheels: 6 (pcs).

Load of pollutant E for whole distance:

E= 436.14 x 1.000.000/(20x 1000 x 3600) = 17.32 (mg/m.s).

To assess the impacts of dust in the process of site clearance, Sutton model for defining the pollutant content at a certain moment is applied to calculated in the form of:

$$C = \frac{0.8E\left\{\exp\left[\frac{-(z+h)^2}{2\delta_z{}^2}\right] + \exp\left[\frac{-(z-h)^2}{2\delta_z{}^2}\right]\right\}}{\delta_z u}$$

Where:

- C: Content of dust in the air (mg/m3).
- E: Load of pollutants from wasst source (mg/m.s).
- z: Height of calculated point: 1(m).
- h: Hieght of road surface comparing to suroungding ground: 0,5 (m).
- u: Average wind speed in the area 1,5 (m/s).
- x: Coordinate of required point (m).
- δ¬z: Coefficient of dust diffusion under z direction, defined by the following formula:

$$\delta_z = 0.53x^{0.73}$$

And x is distance along to wind direction from the required point to emission source (m), coefficient of pollutant diffusion is equal to:

Table 5-6: Calculation of dust concentration in the air

X (m)	$^{\delta}$ (m)	E1(mg/m.s)	Z (m)	H (m)	U (m/s)	C (mg/m3)
10	2.846	17.31	1	0.5	1.5	7.020
50	9.216	17.31	1	0.5	1.5	2.018
100	15.285	17.31	1	0.5	1.5	1.211
150	20.551	17.31	1	0.5	1.5	0.900
200	25.353	17.31	1	0.5	1.5	0.729
250	29.838	17.31	1	0.5	1.5	0.619
300	34.086	17.31	1	0.5	1.5	0.542
350	38.146	17.31	1	0.5	1.5	0.484
400	42.051	17.31	1	0.5	1.5	0.439
450	45.827	17.31	1	0.5	1.5	0.403
500	49.491	17.31	1	0.5	1.5	0.373
550	53.057	17.31	1	0.5	1.5	0.348
600	56.536	17.31	1	0.5	1.5	0.327
650	59.938	17.31	1	0,5	1,5	0,30
700	63.270	17.31	1	0.5	1.5	0.292

During the period of transportation, vehicles operate continuously at high frequencies in the project area so it can create large amount of dust. Dust in the air will impede the vision, affecting health of workers and residents surrounding. Dust also affects to animals and plants. The leaves covered by dust layer can reduce the photosynthesis efficiency, affecting the growth and development of plants.

According to the above calculation, at a distance of 700 m between two sides of the road , the dust concentration is 0.298 mg / m3 meeting standard QCVN 05: 2009 / BTNMT permitting (0.3 mg/m3 for 1 hour). Through that, it may determine the affecting space of this dust is in the building and 700m around from the edge of the road according to the wind direction. In this range, the population living in affected greatly in 7 months. These local powerful impacts after the Subproject operation, such impacts will be no longer available. However, during the construction period of the Subproject, it's requested to pay attention to the measures to minimize the amount of dust and emissions arising from the transportation of materials, minimizing impact to the residents within a radius of 700m.

**** Impacts from gas emissions:*** The material trucks going out and in the Project area mainly consume gasoline and diesel oil. During operation of fuel combustion, amount of exhaust gases containing air pollutants such as dust, CO, CO2, SO2, NOx, hydrocarbons ... shall be released to environment.

The emitted level of pollutants depends on several factors such as air temperature, vehicle speed, distance, kinds of fuel and pollution control measures. According to the World Health Organization WHO, method forecasting the load of pollutants from diesel motors including:

Table 5-7: Emission coefficient by one transport means in traffic

Criteria	Coefficient (kg/1000km)	Distance (km)	Time (min)	No. of vehicles (in/out)	Emission amount (g/min)
SO2	4.15*S	20	4.4	1	0.094
NOx	14.4	20	4.4	1	65.455
CO	2.9	20	4.4	1	13.182
HC	0.8	20	4.4	1	3..36

S: The sulfur concentration in lubricant, S = 0,5%

Source WHO: Evaluation of pollution sources of soil, water, air - Book 1, Generva, 1993 .

Table 5-8: Estimated emissions corresponding to the number of transport vehicles

No. of vehicles (turns)	SO2 (g/min)	NOx (g/min)	CO (g/min)	HC (g/min)
157	2173.5	1508341.1	303763.1	83796.7

The scope of the impact of dust, toxic gases from the transportation of materials is mainly on construction sites, the impact is only of local nature. However, the large amount of gases emitted during construction works, construction site workers will be affected.

Impacts on vegetation along the transport routes and agricultural ecosystems, especially rice fields along the transport route covered by the dust layer on the surface of biological yield loss due to affected photosynthesis.

The operation of construction equipment will have impact on the quality of ambient air because these means of transport use of gasoline or diesel as fuel, waste gases generated from the combustion process such as dust, CO, SO2, NO2, total hydrocarbons. Although the impact is only partial, mainly affecting construction workers on site in the mining sector to create, building area for accessories items, create storage areas but with large emissions out, ambient air is greatly local polluted.

**** Impacts from noise- vibration:*** All human activities, on-site equipment will generate the noise. The spreading level of noise depends on sound level and distance from noise source to the receiving environment. Noise affects worker's health in the site and residential zone.

Spreading ability of the noise from construction equipment to the surrounding area is approximately calculated by the following formula:

$$L = Lp - \Delta Ld - \Delta Lb - \Delta Ln(dBA)$$

Where:

- L : Noise level transmitting to the predicted point at ambient environment, dBA
- Lp: Level of noise source, dBA

- ΔLb: Reduction level of noise source transmitting through obstacles. Terrain of project area is wide, spacious and no obtacles so ΔLb = 0.
- ΔLn: Reduction level of noise source transmitting through the air and surface's absorption. Within the small area, it can be obmitted.
- ΔLd: Reduction level of noise source corresponding to the distance, dBA; ΔLd =20*lg[(r2/r1)1+a]

Where:

- r1: Distance for specifying typical sound level of source, about 1m for the source point.
- r2: Distance for reducing noise level calculating from noise source, m.
- a: Coefficient of noise absorption of topographical surface. For empty surface, a = 0.

Basing on the above formula, we can calculate the noise level in the ambient air environment at the distnce of 50m and 100m from the noise source. The calculated results are shown in the below table.

Table 5-9: Maximum noise level (dBA) from the operations of means of transportation and mechanical equipment

No.	Type	Noise level corresponding to 1-m distance		Noise level corresponding to distance					
		Distance	TB	5m	10m	20m	50m	100m	200m
1	Truck	82-94	88	74.0	68.0	62.0	54.0	48	42
2	Concrete mixer	75-88	81.5	67.5	61.5	55.5	47.5	41.5	35.5
3	Digger	75-98	86.5	72.5	66.5	60.5	52.5	46.5	40.5
4	Excavator	75-86	80.5	66.5	60.5	54.5	46.5	40.5	34.5
5	Compressor	75-90	82.5	68.5	62.5	56.5	48.5	42.5	36.5
QCVN 26:2010/BTNMT: National Technical Regulation on Noise: 70dBA (from 6h-21h) and 55dBA (from 21h-6h)									

Source: Prof. Dr. Pham Ngoc Dang, Air Environment, Science and Techniques Publishing House, Hanoi – 1997

Noise level that is higher than standard level will cause the impacts on health of workers as well as insomnia, fatigue, ennui. High noise level reduces labor performance, health of officials and workers in the manufacturing area. Exposure to intense noise for a long time will reduce the ability to hear, leading to occupational deafness. According to statistics from the Ministry of Health and Institute for Scientific and Technical Research on Labor Protection of Vietnam General Confederation of Labor, the noise adversely affects most parts of the human body. The impact of noise on the human body at different frequency ranges can be shown in the following table:

Table 5-10: Harm effects of noise at the high level for human health

Noise level (dBA)	Impact on the audiences
0	Hearing threshold
100	Initial to change heartbeat
110	Strongly stimulate the tympanic membrane

120	Threshold of pain
130 ÷ 135	Cause neuropathy, nausea, weaken touch and muscle
140	Cause ear pain, dementia, crazy
145	The maximum limit human can suffer the noise
150	Being broken tympanic membrane if hearing in long time
160	Being in danger if hearing in long time
190	Only hearing in a short time is also dangerous.

In general, noise pollution takes place in local area, directly impacts to workers in the site. Basing on NTR 26:2010/BTNMT, the impact of noise from a distance of 10m onwards is under the acceptable level, so the project does not remarkably influence the surrounding area.

Vibration is generated from the excavation and operation of equipment. These activities create vibration on the site, including:

- 8-ton mechanical hammer with closing force of about 48 KJ can create vibration of 12.9 mm/s at a distance of 10 m.

- Equipment for ramming the soil down with force of 30 KJ can create vibration of 4.3 mm/s at a distance of 10 m.

- Diesel hammer can create vibrations 7 mm/s at a distance of 10m.

Vibration at the high frequency will cause mental fatigue for the workers; Vibration from 5.0 mm/s or higher may adversely affect to the stability of the contruction works. The vibrations arising from the operations of equipment on site affect within the scope of the construction area only, workers on site at the distance of 15 m from the source.

c. Impact on soil environment

**** Solid waste activities:*** Construction site will focus about 52 workers / day (2 shifts), domestic solid waste generated are mainly paper, plastic types, cigarette butts, cans of soft drinks, beer shell. According to survey data of similar projects approved, the volume of solid waste per capita is estimated at 0.5 kg / day. So the estimated volume of domestic waste is about 13 kg/day. The amount of this waste, though not much, but if not collected daily will cause pollution to soil environment of the site and surrounding area.

**** Solid waste from construction:*** The construction activities: The solid waste generated from the construction activities including waste rock from the excavation for spill extension, sand and gravel, ..., surplus materials and spillage during construction as broken bricks, broken roofing, beams, formwork, including cement, steel scrap, ... The volume of solid waste is generated depends on the mode of construction and project management. However, this is the kind of solid waste of valuable use, the project owner will collect up for reuse or sellingtoother units in need, so this kind of solid waste emissions are less likely to external environment.

**** Hazardous waste:*** From repair and maintenance of machinery and means of transport: creating waste lubricant, grease and oil contaminated material (rags, grease sludge). The hazardous waste likely arised in the construction phase is mainly greasing contaminated waste. The amount of grease waste generated during construction depends on factors:

+ The number of motor vehicles and mechanical construction on the site;

+ The amount of oil discharged from the mechanical construction vehicles;

+ Cycle of grease change and maintenance of machinery and equipment.

Office Activities: pin out and broken fluorescent bulbs, which are not hazardous wastes arising frequently difficult to estimate the number but still need good management to not have a negative impact on soil environment.

There is also solid waste from the infected worker. However this hazardous waste generated infrequently, with small amounts will not cause significant impacts to the environment.

***Land tenure:** Within the scope of the project area occupied from production forestry, agriculture land upon Subproject implementation will affect the level of forest cover (about 29000m2 area of forest land allocated to households), loss ofproduction, forestry and agriculture land having impact on people's parts related to these activities within the scope of the Subproject. However, due to the compensation and clearance plan has been made in the preparation phase, such impact basically remains small.

d. Impacts on bioenvironment

Items namely building management, reinforcing structural overflow, drain water, dam can become a source of potential impacts on grazing activities of the local people, the watersheds environment receiving large amounts of water and soil environment of the surrounding residential area.

5.3.4. The impact of the operational phase

5.3.4.1. Activities

During operational phase, there are some activities affecting environment and society such as:

- Irrigation activities from agriculture.

- Activities from operational workers.

5.3.4.2. Source impacts

- Wastewater and solid waste from domestic activities of operational workers.

- Termites: appears during operational phase of the headwork complex.

- Disaster: earthquake, transport…..

5.3.4.3. Impacts on social

During the operational and management phase of Dai Thang reservior there will be some positive impacts on socio - economic environment of local and contribute to improving the quality of life of citizens and ensure water supply for people use in domestic production activities (mainly agricultural activities).

Increased use of fertilizers and pesticides

The conditions of agricultural production improvement, investing in production to increase profits can be increase use of fertilizers and pesticides thus increasing environmental pollution. Currently, the locals are applying safety cultivation solutions such as IBM, ACM, "3 reduction, 3 increase", "1 must, 5 reduction", and planting flowers off the ground, etc; all

these activities are aimed at limiting the impact of fertilizers and pesticides to people's health. However, still need to manage the production and operation of appropriate irrigation systems, including continuing to encourage and guide people to apply new environment friendly production methods.

Impacts on managerial capacity and operation of irrigation system

Project Dam Rehabilitation and Safety Improvement Project (DRaSIP) to be deployed will help reinforce the safety of reservoirs, besides helping the management body of the province in the project build script, long termrural development, taking into account the climate change scenario, realization of activities to implement the national target program on mitigation and experimental evidence of climate change; Irrigation Development Strategy 2020 and Vision 2050, the National Strategy for water supply and rural sanitation by 2020; The socio-economic development of mountain areas by 2020; Program national target for new rural construction;Three - sector agricultural development program...

5.3.4.4. Impacts on environment

**** Impacts from wastewater***

Table 5-11: Planned managment staff and employees

Management staff	Technican	Valve operating employee at the tower	Total
1 (concurrent title)	1	1	3

From the above table we can see the amount of waste water from the activities is about: **3 * 80 liters / day = 240 liters / day**

However, the newly designed managing house is associated with a closed toilet meting environmental standards, the waste water is collected and processed in the septic tank before discharge into the receiving environment.

During operation, grease from the in-off valve at the tower could fall Dai Thang Reservoir, but that small amount of grease shall not significantly affect water quality and the environment as well.

**** Impacs from solid waste source:*** Domestic solid waste includes: food, drinking and daily items at the average level: **0.5 kg/person/day x 3 persons = 1.5 kg/day**

The waste amount is collected and gathered at right places in the station and periodically moved away by environmental sanitation company under the contract so that it should not pollute the environment.

Production waste: No waste in the production.

Hazardous waste: From the maintenance of machinery as petroleum rag. It can be reduced the pollution risks because of having its own collection area in processing station and waste treatment contract with environmental sanitation company.

Impacts from emissions.The operation process of reservoir Dai Thang shall not generate emissions. Emissions generated only during operation course of irrigation pump system in agricultural activities.

**** Impacts from noise, vibration:*** Noise and vibration derived from the operation area of the project mostly comes from the opening and closing of valves in the tower. Thus, it does not affect the residents because of small and infrequent noises. Moreover, the operational area of project is located quite far from residential zone so it can be considered that sources of noise pollution and vibration are not significant.

**** Basins erosion and sediment in the lake:*** Basin erosion and sediment in the lake: The problem of basins erosion and sediment in the river should be mentioned in research design, especially items of dead storage of the reservoir and safety corridor irrigation.

**** Dam damaging termites:*** Works after being put into the operational phase will have trouble of termitesnesting. Termites nest long will result in rotten dam, causing infiltration and reduce the intensity of the dam as well as its function.

**** Other impacts:***

Destroying rare ecosystem, the cultural and historical values: ecosystems, rare cultural value is not defined in the scope of work.

Other impacts as transport, fisheries, earthquake should not be mentioned because this project is of small-scale, built in sparsely populated areas, smallexploitation of the basin.

To raise the underground water level: The dam upgrading and improvement for the reservoir safety, not raise the water level and capacity in the reservoir, so prior to and after the construction work, the underground water level in the area does not alter.

Use of irrigationwater: The calculation of irrigation regimes and plant structure has been calculated in detail and specific crops, fisheries; so local authorities should have specific policies and agreement to avoid conflicts between upstream and downstream water users.

5.4. Assessing the impact of risk incidents

5.4.1. The preparation phase:

The main risks of the project arising from the delay in implementing the economic benefits of the project are very sensitive to this factor. The reasons can cause delays in the implementation of the project benefits include delay in recruitment of project consultancy, delay in appointment of project managers, cumbersome administrative procedures relating to the signing contract and insensitive handling to resettlement issues.

The rational allocation of capital may lead to project delays. However, Hanoi People's Committee will ensure appropriate budget allocations due to cost sharing between the city, district and commune authorities to ensure the sustainability of the project.

5.4.2 Construction stage

- For community health: Require the contractor and construction unit to tightly check and supervise in order to prevent the sick infection for the community from all types of wastes generated in the living process of workers during work construction;

- For labour safety: Strictly comply with regulations on labour safety. Factors relating to environment, labor intensity, environmental pollution level all can cause the bad impacts on worker's health such as fatigue, dizziness. Installation, construction and material transportation, waste removal with highly operational intensity of trucks can lead to labor and traffic accidents in the region.

- Problems in the security order in the process of construction.

5.4.3 During the operational phase

After the project goes into operation there is hardly littile arising pollutants: sewage, waste gas and solid waste; negative impact is mainly some small incidents. The small incident can occur as floods, erosion and sediment basins inside lake bed. It's important to pay attention to management of protective forests to reduce erosion basin, which will increase the amount of sediment in the reservoir .

Risks on normal labor accidents such as fall or stumble on the spillway, dam, especially in flooding reason, it can threaten the life. Therefore, it is extremely nesccesary to put the attention on operations of sub-project to avoid the above problems.

PART VI: ALTERNATIVES ANALYSIS

6.1. No action alternatives

Several alternatives have been considered in feasibility study of the sub-project, includes:

No project implementation

Dai Thang Reservoir was built and used for 50 years ago. Currently, the headwork of Dai Thang Reservoir has been damaged and degraded. Without the project, the risk of dam failure is dramatically increase, and it will impact to 130 ha of paddy rice and 30 ha of crops. Thus, the sub-project is relatively effect to upgrade and improve the existing conditions of the dam. In the long term period, it will bring more efficiency to the local resident by reducing the risk of dam failure and its appurtenant structures, improve the efficiency of the exploitation of reservoir and water resources sustainable development in the regional. In addition, upgrading of Dai Thang Reservoir can prevent flooding for downstream people in Dai Dong, Thang Loi and Dai Thang villages, contribute to improvement of crops yield, specially for 100ha of paddy rice and 30 ha of crops.

6.2. With project implementation alternative

a) Borrow pit

The borrow pit is located in the left side of dam with about 700 m distance. At the moment, this space is the land of acicia without any household. Using this area for borrow pit, it requires agrio-forestry land, therefore it decrease the income of the household being lost of this land. However, with a large amount of soil demand (50 000 m2), the selection of borrow pit closely to the work allows to reduce negative impacts of dust generation during construction phase. This selection will reduce so much impact on environmental and resident areas in 20km of transport route (compares to quarry).

b) Selection of camps

The first selection of camp was only space next to spillway, including two camps, one for management board and one for workers in construction phase. For this purpose, it required 560 m2 of land; however, the spare space surrounding spillway is only around 500m2 which is not enough for the land demand. Therefore, consultants proposed to devide into 2 camps as 500m2 for workers' house and 60 m2 for consultant and management board's house. The second camp (for consultant and management board) will be located next to inter-village road of An Binh and construction road of the headwork.

PART 7: ENVIRONMENT AND SOCIETY MANAGEMENT PLAN (ESMP)

7.1. The objectives of Environment and Society Management Plan (ESMP)

Ensuring the compliance with regulations, laws, standards and guidelines applicable at the provincial and national level.

- Ensuring that resources are sufficiently allocated basing on project budget to carry out activities related to the ESMP.

- Ensuring that the environmental and social risks of SUB-PROJECT are managed appropriately.

- Responding to unforeseen and unidentified environmental issues in the environmental impact assessment by project.

- Feedback for the continued improvement of environmental performance.

The Environment and Society Management Plan (ESMP) outlines the mitigation measures, monitoring and institutional measures that will be deployed during the building and operation of the sub-project to avoid or control the adverse effects the environment and society and the necessary actions to implement mitigation measures. ESMP creates useful link between the measures to minimize adverse impacts and to ensure that such measures will be implemented.

The contents of IMP outlines responsibilities for the implementation, implementation monitoring, implementation budget and the execution time of the mitigation measures proposed in section 7. The summary of environment management plan of sub-project is as follows:

7.2. Mitigation Measure

7.2.1. Potential impacts and mitigation measures

7.2.1.1 Mitigation measures in preparation phase

Table 7-1: Measures to minimize the environmental impacts of the sub-project in the preparation phase

Potential impacts	**Mitigation measures**	**Effectiveness** **Pros and cons**
Generating dust	Equipping sprinkling vehicles, watering the road. Water spraying in the area of leveling and transport routes from Chi Ne town to tent zone, material collection around Dai Thang Reservoir Covering trucks with tarpaulin during transport service, specially trucks transport from Chi Ne town to Dai Thang Reservoir (with a distance of 20km).	Pros: Feasible, simple and easy to implement, and help to reduce air pollution. Cons: Impossible to completely overcome. During 20km of transport route (from Chi Ne town to subproject zone), environment and people surrounding (around 100m) are still influnced by dust generation.
Generating noise	Ensuring construction equipment is maintained periodically. Using high quality machines for cleanance Activities causing loud noise should be carried out during day time, focusing on influenced zone of 25000m2 of agrio-forestry land and 20km of transprot route from Chi Ne town to Duc Binh village..	Pros: Feasible, simple and easy to implement. Cons: Construction Contractor's awareness is required and there should be committments between construction contractor and Project Management Unit
Generating waste	Bins for collecting solid domestic waste with capacity of 2.5kg solid waste/day Bins for oil and grease waste from machine using in preparation phase, from two tent zones of this subproject. Bins for oil rag from above machines. Mobile toilets for about 5 workers in preparation phase, often work in this area.	Pros: Feasible, simple and easy to implement. Cons: Requirement of connection between Contractors and units specilizing in collecting and treating domestic and oil waste (DONRE of Lac Thuy District, Hoa binh province).

Table 7-1: Measures to minimize the social impacts of the sub-project in the preparation phase

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
Affecting forestry and agricultural manufacturing activities of affected households	Implementing mitigation measures as outlined in the resettlement plan with full compensation for 15935m2 of land tenure for 12 households in Duc Binh village. The clearance and resettlement are the responsibility of the District's Board of compensation, resettlement in Lac Thuy District, Hoa Binh Province. (Detailed in RAP report)	Pros: Compensation and implementation of supporting policy partially help stabilize the income of the affected people (12 households in Duc Binh village) Cons: It can meet some opposite ideas of people on the level of compensation and assistance (12 households in Duc Binh village)

7.2.1.2. Mitigation measure in construction phase

Table 7-3: Measures to minimize the environmental impact of the sub-project during construction period

	Mitigation measures	**Effectiveness** **Pros and cons**
1. Air pollution due to material transportation from Chi Ne Town	+ Covering trucks of soil, stone, ciment transporting in 20km transport route with tarpaulin + Spraying water to clean roads regularly, twice per day (early morning and late afternoon) in the route of Chi Ne – Duc Binh + Following load permits for trucks (under 7 – 10 tons) and following load permits for trucks of inter-village road in An Binh commune (less than 7 tons).	Pros: Feasible, simple and easy to implement. Cons: Impossible to completely overcome pollution level. People surrounding of 700m in 20km transport route from Chi Ne town to subproject zone are highly impacted by the dust generation from trucks.
2. Soil pollution by oil or other chemical spills or leaks.	+ Storing chemicals and oil in suitable containers from concrete mixer, vibrator, trucks using in this phase. + Spare stoarge areas with concrete floor and plastics. + Ensuring vehicles and construction equipment is maintained carefully + Timely resolving the issues of oil or chemical leaks and spills. Prevent oil or chemical leaking to Dai Thang Reservoir.	Pros: Feasible, simple and easy to implement with high effectiveness. Cons: Plastic fabric and warehouse floor and yard as well as technological solutions for waste treatment are required, reduce spare areas for other auxiliary works of this subproject, probably requires more agrio-forestry land in Duc Binh village. Require technique to treat waste and wastewater for reduceing soil pollution.
3. Pollution of water source and aquatic environment due to waste, lubricants, machinery, and waste from workers.	+ Spare stoarge areas with concrete floors and plastic fabric. In this subproject, spare storage areas can be located in spare land using for auxiliary works with the area of 4.7ha. + Ensuring vehicles and construction equipment is maintained carefully + Two mobile toilets are required for 2 camps during 7 months (from November to May) in the construction phase + The storage of waste should be in a safe distance to the surfacewater source with a distance about 50 – 100 m from Dai Thang Reservoir. + There should be solutions for polluted water, focusing on two camps of workers and management house (high risks of water pollution).	Pros: Feasible, simple and easy to implement with high effectiveness. Cons: Plastic fabric and warehouse floor and yard as well as technological solutions for waste treatment are required, reduce spare areas for other auxiliary works of this subproject, probably requires more agrio-forestry land in Duc Binh village. Require technique to treat waste and wastewater for reduceing soil pollution.

6. Noise from construction equiment	+ Motorized vehicles and construction equiment should be maintained periodically.Noticeably, trucks for soil, stone, gravel, ciment transport from Chi Ne to Duc Binh village and the concrete mixer, vibrators using in this work. + Construction activities should be implemented during the day time, from 8am to 5 pm. + Communicating with local people about the noise level during construction process, focusing on 12 households of Duc Binh village (direct impact from subproject) and other households in An Binh commune.	Pros: Simple, easy to implement, highly effective without technology complexity, low expense Cons: There must be a commitment by builders and investors, shown on the construction contract. Noise impacts can only be minimized, not be thoroughly overcome. People in Duc Binh village are directly impacted by this noise.
9. Impacts around area of mines to exploit land, stone, sand such as dust, noise, safety, pollution of soil and water by mining activities	- Maintenance of machinery and equipment should be carried out regularly (once per month), using good quality oil. - Having measures to collect and manage splattered oil sensibly. - Having container to store 13 kg solid waste/day, generating from 52 workers in 7 months of construction phase. + Equip protective equipment properly and techniques for 52 workers (devided by two shifts in a day) in the construction process - Erecting fencing, entrance gates and latches with gaurding spots in order to prevent the entry of people and animals (cows, buffaloes) from 3 villages: Dai Thang, Thang loi, Dai Dong; - On dry days, watering land mines located at the left side of the dam. - Contractor must choose the competent providersto provide building materials from Chi Ne town to Dai Thang Reservoir.	Pros: These measures are feasible and within the capacity of Construction Unit. Cons: Contractor to prepare the conditions for construction machines, warehouse, yard prior to construction. It should be coordinated with the specialized units to ensure the disposal of waste. These measures will bring good results for borrow pits (in Chi Ne town), quarry (located in left side of the dam), waste dumping (next to spill), if the Contractor and construction workers are awared or educated about environmental protection and checked by Investor.

Table 7-4: The mitigation measures of social impacts in the construction phase

	Mitigation measures	**Effectiveness** **Pros and cons**
1. Cutting of water while reinforcing structural spill	+ Conducting spill reinforcement in the time of less agricultural irrigation + Speeding up structural reinforcement spill, finishing this work within 6	- Pros: Simple, easy to implement without technology complexity. Cons: Effectiveness depends on the progress of

disrupts water supply capacity for production in downstream areas (in 3 villages: Dai Dong, Thang Loi, Dai Thang)	months (from November to April). + For technical measures such as creating temporary water channels from Dai Thang reservoir to of farm produce of villages in An Binh commune.	construction, irrigation needs of production activities of farmers in An Binh commune.
2. Dam Safety Risks	+ Proceeding most activities of dam and sewer upgrading of headwork complex of Dai Thang Reservoir in the dry season, finish in May, 2016. + Speeding up the construction progress (from November, 2015 to May 2016).	Pros: Simple, easy to implement without technology complexity, low expense Cons: Effectiveness depends on the construction progress, experience and capacity of Construction Unit as well as Dai Thang Reservoir capacity.
3. Obstructing traffic and increasing the risk of traffic accidents and reducing the possibility of access to social services (schools, markets and health centers ...) in the sub-project area, in the road from Chi Ne town to the construction site.	+ Installation of signs, lights in the construction area; and also on the trnasport route of 20km from Chi Ne to subproject zone. + Lifting awareness for driver, try not to transport materials in rush hours (in this zone, the rush hours are from 8 am to 10 am and from 4 pm to 5 pm) ; + No gathering of the materials in front of the passage of people and other busy spots such as school, medical center, market… in An Binh commune. + Notice of the construction plan for the community (leader of An Binh commune and local resident here).	Pros: Simple, easy to implement, highly effective without technology complexity. Cons: There should be committement between Construction Contractor and Investor, representing on construction contracts. Risks, accidents can be entirely preventable. However the impacts of obstructing traffic from Chi Ne to Duc Binh and access to social services of An Binh commune can only be minimized but not be thoroughly overcome.
4. The noise generate from construction equipment	+ The motor vehicles, construction equipment must be maintained periodically. + Avoid performing construction activities near residential areas in the lunch hour, or after 20 PM. + Inform the construction plans regularly to communities and local	These mitigation measures are simple, easy to implement, do not need the technology or complex technical. However, there must be a commitment by construction contract between building contractors and project management

	government by phone, speakerphone, text, or on the notice board of the Commune people's committees	unit. Noise impacts can only mitigate, not being able to completely overcome.
5. That 50 construction workers staying in the locality per day may disturb the social order and security.	+ Make use of local workers, employing men at the labor age, consider men belonging to poor households and Muong Ethnic. + Consult local authorities of An Binh commune about helping workers to rent houses in Duc Binh village instead of setting up camp with better advantages for the management of solid wastes. + Educate community awareness for workers, avoiding conflicts with local people (Muong Ethnic) which result in loss of social order and secirity in An Binh commune. + Orient workers how to prevent infectious diseases such as HIV / AIDS and other social evils such as gambling, prostitution, theft .. + Workers are not allowed to exploit local natuaral resources as acacia excavation, aquatic activities (fishy activities) in An Binh commune.	Pros: These measures are feasible and within the capacity of Construction Unit. Cons: However, effectiveness depends on workers' awareness and responsibilities of Construction Unit. An Binh commune should participate in supervision and dectection of violations. There must be a committment between Construction Unit and the relevant parties (leader of An Binh commune, representatives of 4 villages: Dai Dong, Duc Binh, Thang Loi and Dai Thang, and head of Muong Ethnic in An Binh commune)..
5. The threats to the worker's health and labor safety in the project area	Safety measures in the construction area: + Safe staff should be arranged to implement safety measures at construction sites. Safe staff should be trained in emergency first aid; + Provide adequate equipment and personal safety for employees (such as helmets, gloves, belt, etc.) and training them to use; + Install safety regulation table in the field. + Install fencing around the construction. Reduce the risk from material transport processes along the route: + The speed should be limited along the route (management road and dam) but it should be compliant with the residential areas and intersection segments. + The contractor should conduct meetings or informing with commune staff and local people regularly, informing them about the progress of	The above measures can fully implement and they will have highly effective if they are in full compliance with the above provisions. However, it depends largely on the self-consciousness and the observance of workers.

	construction and traffic safety, and helping residents aware of the risks to beware. + Limit material transport in the wet season and the vehicle should be avoided overloading than the standard of roads and bridges. + Damaged pavements should be repaired timely. Implement measures to reduce dust as stated;	
10. Impacts on ethnic minorities, children and gender equity.	- Adding to Ethnic Minority Development Framework (EMDF) and Ethnic Minority Development Plan (EMDP) for Muong Ethnic (more than 70%, upto 90%) in An Binh commune.. - Having site management measures to minimize or eliminate the impact of the implementation and impact on ethnic minority groups by providing safety signs, respect the customs of ethnic minorities of Muong, the participating unit projects need ethnic translator, if necessary. - Implementing the action plan to help the people as well as managers, local government controls as An Binh commune and supervisies. The Consultancy Unit consulted ethnic minorities in the project area freely, pre-informed and in a proper manner (FPIC), so they could define 03 affected households that would be supported. (Detailed in EMDP report) Solutions include: Solution 1: support for recovering community livelihood Solution 2: A media program only for ethnic minorities in the subprojects Solution 3: Clean water for households	Pros: These measures are workable and in the ability to perform by subproject management unit, can minimize or eliminate the damage. Cons: Co-operations with local residents, especially in 3 villages of Duc Binh, Dai Thang and Thang Loi. Specific plan and details of measures to develop ethinic minority (Muong Ethnic) are needed.

7.2.1.3. Mitigation measures in operation phase

Table 7-2: Measures to minimize the environmental and social impact of the sub-project during operation

Potential impact	Mitigation measures	Effectiveness Pros and cons
Disaster risks causing unsafety (due to do disasters, erosion, sedimentation or termites)	+ The operation management unit of Dai Thang Reservoir should periodically check the safety. + Local Commune People's Committee and the people should have plans to respond to disasters basing on community. + Strictly obey regulations on the operation of cluster headwork, especially in rainy seasons when the risks of flood are high. + Promptly notify the flood discharge (if necessary) to people in in 3 villages (Dai Dong, Dai Thang and Thang Loi) at least 3 days in advance to actively capture and respond for 100 ha of paddy rice and 30 has of crops. + Build a safe corridor for the flood discharge when necessary based on forecast scenarios of the impacts of space due to dam failure in Dai Thang Reservoir. + There timely remedial measures when termites appear.	Pros: Proper implementation of these measures will minimize the impacts during construction phase. Cons: This measure also requires strict observance of the principle of protecting corridors of irrigation works under the Ordinance on exploitation of irrigation works.
Use of water source for 100 ha of rice and crops	+ Calculation of irrigation regimes and appropriate crop mechanism to increase the efficiency of irrigation water supply of the reservoir. Discharge mode depends on irrigation mode of 100 ha paddy rice and 30 ha crops. + Effective operation of canals systems from Dai Thang reservoir to villages in AnBinh commune.	Pros: Simple and highly effective. Cons: Requirements of working awareness of operation staff are needed.
Enhancement of fertilizer and pesticide use	The conditions of agricultural production have been improved, investing in production to increase profits can increase use of fertilizers and pesticides, and thus this increases environmental pollution. When the sub-projects go in operation, organize workshops and training of ICM (intergrated crop management) officials at commune and village levels in the sub-project area	
The contradictions in the use of water during operation of the reservoir of people from 3 villages of	+ From time to time, depending on the demand and supply and water level in the lake, adjust the appropriate valve opening; + Educate people in An Binh commune, specially Muong Ethnic in this area to use water economically, strengthen and improve the management and exploitation; + The use of water should be coupled with protection against degradation, depletion of	Pros: Reduce water use conflicts of people from 3 villages. Cons: There should be a close coordination and consistency between the operation units.

Duc Thang, Thang Loi, Dai Thang.	water resources. Attention to environmental protection, especially in the area of Dai Thang reservoir should be paid;	

7.2.2. Estimated cost of mitigation measure

Table 7-6: Mitigation measure and estimated cost

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
Preparation phase	Temporary or permanent recovery of living or agricultural land.	Losing a part of livelihood opportunities of the people.	+ The compensation for farmers / landowners under the bracket of the province of Hoa Binh and harmony with the policies of the World Bank. + The public consultation, the benefit are to be done. + The tally of damage is to comply with prescribed regulations, especially with the participation of affected people.	Fund of the province	Prior to the project. Estimate time:	PMU works with Board of compansation for clearance of An Binh commune	PMU and An Binh People's Committee and Department of Agriculture and Rural Development
	Clearing of forest and agricultural land, and leveling	- Generating dust and dirt; however, the level of dust in this stage does not affect much to the health or cause great discomfort for construction workers, local villagers and the environment because the	- Spray the water on construction area and the road where trucks and waste material pass. - The amount of traffic must follow regulations in the prescribed areas and each road segment that is defined - Use as soon as possible the gathered materials. - Cover all exposed materials	+ 1 mil/ tarpaulin x 20 tarpaulins = 20 million. + Protective clothing : clothes, gloves, masks, glasses: Estimate : 300000 VND/1 set * 50 = 15 mil.: 500000/1 set*30 people = 15			

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
		construction is airy area. - Reducing air quality surrounding areas and affecting the health of workers - Impacting on forest cover - Loss of land and crop production leading to the reduction of the income of the people	during transport.	million.			
	Gathering vehicles and machines	- Noise, dust, emissions and occupied premises	- Making relocation planning, gathering the right equipment to avoid affecting the daily life of residents		During the preparation phase	Construction Unit	Investor
	Material transportation for temporary roads	- Increasing risks of traffic accidents. - Generating dust, noise and air pollution in transportation roads and at construction sites.	-Arranging the stockpile at the end of the monsoon direction - Spraying water on materials in the the construction process generates dust: watering sand when transporting, watering before knocking down houses... - Prepare 30 tarpaulins to		Daily	Construction Unit	Investor

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
			cover trucks with if the trucks do not have or replace if tarpaulins are in bad condition. - Spraying water to reduce dust during peak hours of transportation.				
	Making temporary construction roads	- Generating dust, noise and air pollution.	- The building activities should be conducted during the day - If these activities cannot be done during the day, notifications should be made in order to reach agreement with local committee and people.				
	Residence of workers in the area	Disrupt the lives of people On the other hand, can increase employment opportunities for local people during construction activities such as catering and entertainment for the	+ Sign up temporary residence, temporary absense for workers + Contractors instruct how to communicate and interact with government and community + Construction contractors require workers to comply with regulations while living in the community (no	Contractor	When workers start living temporarily in the area	Contractor	Supervision Consultant

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
		workers.	quarrelling with the locals, no gambling, or theft ...)				
	Camp building	- Dust and solid waste	- Sufficent supply of hygien sevices and waste collection	- 02 180 litre plastic bins 1mil/bin * 2 = 2 million - 02 two-compartment mobile bathrooms: 25 million*2= 50 million - 2 PT-4C mobile toilets: 20tr *2 = 40 million	Purchase before the implementation of the project	Construction Unit	Investor
			TOTAL COST FOR PREPARATION PHASE	127 million			
	The construction activities of work items	- Reduce the quality of air environment because of dust, emissions, noise and	- Do not use obsolete equipment, maintain machinery and vehicles every 6 months	Estimate 15 million	Daily and regularly during the construction phase	Construction Unit	Investor

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
Construction phase		vibration	- Watering regularly on construction sites and along construction roads	Estimate 8 million			
			- Cover the tarpaulin in the gathering yards of material, covering the truck with tarpaulins.				
		- Generating solid waste, soil spillage and hazardous waste (waste oil, grease rag) causing water, air and soil pollution.	- Remove, handle the amount of soil excavation and removal of weather on the ground	Estimate: 15 million	Daily	Construction Unit	Investor
			- At each construction sites, 02 180-litre waste bins are set for hazardous waste;	1mil/bin x 02 = 2 million.	Purchase before the implementation of the project	Construction Unit	Investor
			- Regular clean and collect spilled materials - Classify solid waste and throw in definded bins - Collect and process hazardous waste in accordance with regulations	Service cost for collection and treatment: 10 million/year*1 year = 10 million.	Daily	Construction Unit	Investor
		Runoff stormwater, vehicle and facility washing water	- Use water economically - Build ditches to collect waste water from carwash, construction and rainwater into the pit.	15 million (estimate)	Building prior to the implementation of the project	Construction Unit	Investor
					Daily	Workers at site	Investor

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
		- Impact on safety, working condition, worker's health.	- Arrange proper working time - Workers must be well equipped with workwears - Training to improve possibility of safety and environmental protection prior to construction (once during the construction phase)	- Organize a practice on safety: 10 million (estimate) - Periodic health check for workers: yearly, 15 million (estimate)	During the construction phase	Construction Unit	Investor
		- The environmental incidents: disaster, storm, oil leak, fire…	- Plan to prevent storm, tropical depression, cyclone - Disseminate response plan - Organize rehearsal.		One practice in 8 month-construction	Specialized agencies	Investor
	Transportation of materials	- Air pollution due to noise, dust and emission from vihecles -Impact on transportation infrastructure in the area - Increase risk of	- Transportation in the specified time frame - Proper load and must have cover - Move with allowed maximum speed within the construction site.		Daily	Construction Unit	Investor

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
		traffic accident for people travelling on the road					
	Life activities, accommodation of officers and employees	- Arising domestic sewage	Domestic sewages is led through the ditch to settling pit		Purchase, installation prior to implementation	Contract with distributors	Investor
		- Domestic waste	- Must collect all domestic waste in the camp site - Clean regularly - Contract with local environmental hygien unit to transport and disposal	Collection fee, 10 million per year (estimate)	Purchase and make waste collection contract prior to the project	Construction Unit	Investor
	Repair and hand over transportation routes damaged	- Protect transportation routes in the project area	- Repair, improve damaged transprtation routes	30 million (estimate)	Right after completion of the construction phase	Construction Unit	Investor
		Total cost for the construction phase		130 million			
The operation phase	Revert construction areas: camps, landfill, land exploitation	- Arising solid waste	- Dismentle the camp, signs. - Collect and sell to user. - Gather and move machinery, construction equiment. - Raze and fill exploited area	30 million (estimate)	Right after completion of the construction phase	Construction Unit	Investor
	Monitoring, operation,	- Ensuring safety for whole residential	- Periodically and frequently inspect, maintain.	Cost for construction	Yearly	PPMU	Investor

Sub-Project Phases	**Sub-Project operations**	**Impacts on environment and society**	**Mitigation measures**	**Implementation budget (estimate)**	**Time for implementation and completion**	**Implementation responsibility**	**Monitoring responsibility**
	maintenance, of dam, drain and spillway	area, planting area, infrastructure	- Detect and timely handle encroachment and use dam corridor improperly.	guaranty			
	The training and preventing incidents	- Serving the inspection, timely detection, rescue, rescue when the problem	- Organize training response situation yearly as proposed by the Agriculture and Rural Development Department.	Cost for the operation	Yearly	PPMU	Investor
	Dredging canals	- Avoid sediment, polluting the environment, changing hydrology due to narrow canal, river	- Operate flexibly drain; - Monitor, track, detect phenomenonal sedimented and erosional area,; - There are plans to periodically dredged canals, flow and environmental assurance	Cost for the operation	Yearly	PPMU	Investor
	Cost estimate for the operation phase			30 million			
	COST ESTIMATE FOR THE CONSTRUCTION PREPARATION PHASE, CONSTRUCTION PHASE AND OPERATION PHASE (TT)			417 million			
	VAT			41.7 million			
	Total cost estimate for implementation of EMP			458.7 million			

7.3. Environmental and social monitoring plan (ESMoP)

7.3.1. Environmental Monitoring Program

i) Environmental monitoring program in construction period

Table 7-7: Environmental monitoring in construction period

No.	Sample Type	Location	Frequency of monitoring	Monitoring objectives	Compared standards
I	Monitoring of waste sources management				
1	Sources	Camps Landfill	Every 6 months	The volume of solid waste Number of toilets, tents, waste water treatment system Volume of hazardous waste Waste compositions;	
2	Waste management measures	Construction sites, camps Landfill	Every 3 months	Number of bins Invoices of collection services, transportation of hazardous waste.	
II	Monitoring of impacts on natural environment				
1	Gas	1. Construction area of flood overflow (KK01); 2. Construction of management road (KK02)	**6 months/time** 2 times/day in each time	- Microclimate: temperature, humidity, wind speed - Noise LAeq - Suspended dust TSP - Respiration dust (PM10)- SO2 - CO - NOx	QCVN 05:2013/BTNMT National Technical Regulation on ambient air quality QCVN 26:2010 - National technical regulations on noise. QCVN 27:2010/BTNMT National regulations on vibration
2	Surface water	1. Surface water in the reservoir (NM01) 2. Surface water in front of water drain (NM02) 3. Water near the spillway (NM03)	Every 6 months	- pH - DO - TSS - COD - BOD5 (200C) - NO3- (based on N) -NH4+ (based on N) - PO43- (based on P) - As -Cl- - Total oil, grease	QCVN 08:2008/BTNMT - National Technical Regulations on surface water quality.

No.	Sample Type	Location	Frequency of monitoring	Monitoring objectives	Compared standards
				- Coliform	
3	Ground water	1. Household's wells in the construction site (NN01) 2.Wells of Dai Thang reservoir management office (NN02)	Every 6 months	- Hardness (CaCO3) - TDS - Iron (Fe) - Lead (Pb) - Arsenic (As) - Chrome (Cr6+) - Mangan (Mn) - NH4+ theo N	QCVN 09:2008/BTNMT - National Technical Regulations on ground water quality
3	Soil	1.Surround the temporary disposal area (MĐ 01)	Yearly	- Arsenic (As) - Cadimi (Cd) - Copper (Cu) - Lead (Pb) - Zinc (Zn)	QCVN 03:2008/BTNMT - National technical regulations on heavy metal content in soil.
4	Landslice, erosion	Spillway works	One time	Scale of landslice ; Degree of landslice	
III	Supervision of the environemental hygien and safety				
1	The environmental hygien	Construction site Camp site Material gathering area	Every 3 months	Quantity and condition of toilets Quantity, status of hygien kits First aid kits Medical work Quantity of transfusion, infection Communication plan for public health	
2	The safety	Construction site Camp site Material gathering area Disposal area	Every 3 months	Work protection equipment Safety signs Quantity of accidents	

ii) Environmental monitoring program in operation period

Table 7-8: Environmental monitoring program in operation period

No.	Sample type	Location	Frequency	Objective	Compared standard
I	Supervision of impact on the natural environment				

2	Surface water	1. Lake water in front of water drain (NM04); 2. Lake water near ecology area (NM05)	Every 6 months	- pH - DO - TSS - COD - BOD5 (200C) - NO3- (based on N) - PO43- (based on P) - As - Total oils and grease - Coli form - The residues of plant protection products group Chlorine - The residues of plant protection products group Phosphate	QCVN 08:2008/BTNMT: National technical regulations on surface water quality
4	Landslic, esoion	Downstream of the spillway	During flood within 2 years after operation	Scale of land slice; The degree of landslice	
II	Supervision of impact on the society				
	Impact on the society	Benefited communes area	Every 6 months	Income, jobs, quantity of production, the averrade yield in a production, water supply schedule Complaints and claims of people	

7.3.2. Social monitoring program

Monitoring report requirements and Social monitoring program has been detailed in the independent reports (RAP report and EMDP report)

7.3.3. Estimated cost for environmental and social monitoring

i) Estimated cost for environmental monitoring

Table 7-9: Cost estimation for the environmental supervision in the construction phase

No.	Estimation of cost items	Unit	Quantity	Unit price (VND)	Total (VND)
I	**Supervision of waste sources management**				**10,000,000**
1	Source of arising	Time	1	5,000,000	5,000,000
2	Management measure of emission	Time	1	5,000,000	5,000,000
II	**Supervision of impact on the natural environment**				**17,621,998**
1	Air sample analysis				3,321,756
	Temperature, humidity	Sample	4	7163	28652

	Wind speed	Sample	4	6624	26496
	Noise Laeq	Sample	4	27853	111412
	Suspended dust TSP	Sample	4	65748	262992
	Respiratory dust PM10	Sample	4	65748	262992
	NO2	Sample	4	265928	1063712
	SO2	Sample	4	123717	494868
	CO	Sample	4	141470	565880
2	Surface water sample analysis				9,312,162
	pH	Sample	6	22606	309810
	Dissolved Oxigen (DO)	Sample	6	52997	500112
	Total suspended solid(TSS)	Sample	6	48810	135636
	COD	Sample	6	97311	317982
	BOD 5 (20oC)	Sample	6	66001	292860
	NO3- (based on N)	Sample	6	110681	583866
	NH4+ (based on N)	Sample	6	72843	396006
	PO43- (based on P)	Sample	6	136080	664086
	Asen (As)	Sample	3	82654	437058
	Cl-	Sample	3	132964	816480
	Total oils & grease	Sample	3	167892	495924
	Coliform	Sample	3	90765	797784
3	Ground water sample analysis				4,049,508
	pH	Sample	4	18745	74980
	Hardness	Sample	4	66786	267144
	Amoni (NH4+)	Sample	4	71796	287184
	Asen (As)	Sample	4	66126	264504
	Lead (Pb)	Sample	4	190583	762332
	Crom VI (Cr6+)	Sample	4	143194	572776
	Mangan (Mn)	Sample	4	145567	582268
	Iron (Fe)	Sample	4	157536	630144
	Total Coliform	Sample	4	152044	608176
4	Soil sample analysis				938,572
	Asenic (As)	Sample	2	87335	174670
	Cadmi (Cd)	Sample	2	93160	186320
	Copper (Cu)	Sample	2	97945	195890
	Lead (Pb)	Sample	2	92901	185802
	Zinc (Zn)	Sample	2	97945	195890
III	**Supervision of the environmental hygien and safety**				**10,000,000**
	The environment hygien	Time	1	5,000,000	15,000,000
	Safety	Time	1	5,000,000	15,000,000
IV	**Expenses 3 staffs x 3 days**		**9**	**350,000**	**3,150,000**
V	**Car for sampling analysis (fixed price, estimated 5 million 1time)**	**Time**	**1**	**5,000,000**	**5,000,000**
VI	**Preparation of supervision report**	**Report**	**1**	**4,000,000**	**4,000,000**
VII	Estimated cost for monitoring 1		TT		49,771998

	times (Total I-VI)				
VIII	Total estimated cost (2 lần)	Time	2	49,771,998	99,543,996
VII	General management expense: TT*15%		C		14,931,599
VIIII	Total expense before tax		TC		114,475,000
IX	VAT: (VAT)= 10% x (TC)		VAT		11,447,500
X	Implementation cost for the environmental supervision in the construction period		G		125,922,500
	Rounding				125,922,000

Table 7-10: Cost estimation for the social and environmental supervision in the operation phase

No.	Estimation of cost items	Unit	Quantityy	Unit price (VND)	Total (VND)
I	Supervision of impact on the natural environment				20,925,624
1	Surface water analysis (for once a year)				5,925,624
	pH	Sample	2	22606	45212
	Dissolved oxygen (DO)	Sample	2	52997	105994
	Total of suspended solid (TSS)	Sample	2	48810	97620
	COD	Sample	2	97311	194622
	BOD 5 (20oC)	Sample	2	66001	132002
	NO3- (based on N)	Sample	2	110681	221362
	Total N	Sample	2	136080	272160
	PO43- (based on P)	Sample	2	82654	165308
	Total P	Sample	2	132964	265928
	Asen (As)	Sample	2	167892	335784
	Total oils & grease	Sample	2	253793	507586
	Coliform	Sample	2	216630	433260
	Drug residues of plant protection group Cloride	Sample	2	744188	1488376
	Drug residues of plant protection group Phosphate	Sample	2	739440	1478880
	Cl-	Sample	2	90765	181530
2	Monitoring landslide	Time	1	15000000	15000000

No.	Estimation of cost items	Unit	Quantityy	Unit price (VND)	Total (VND)
II	Expenses 3 stafs x 3 days		9	350,000	3,150,000
III	Car for taking sample analysis (fixed price, estimated 5 million 1 time)	**Time**	**1**	**5,000,000**	**5,000,000**
IV	Prepare supervision report	Report	1	4,000,000	4,000,000
V	Estimation of supervision expense for 1 time (I+IV)	Time	1		33,075,624
VI	Total cost for monitoring 2 years (1 times)	Time	2	33,075,624	66,151,248
VIII	General Management expense: TT*15%		C		9,922,687
IX	Total expense before tax		TC		76,073,935
X	VAT: (VAT)= 10% x (TC)		VAT		7,607,393
XI	**Cost for the environmental supervision in the construction phase**		**G**		**83,681,000**

7.3.4. Environmental management training and capacity building

Table 7-11: The cost of capacity building and training implementation

Content		Trainees	Quantity	Cost (VND)	Fund
Training on food hygiene, occupational safety and environmental protection		Workers and technical staff of contractors	All of workers, staff	50 people x 200,000 VND /person = 10,000,000 VND	To be included in the investor's contract with stakeholders
Training on Environmental Management	Control of emissions sources	PPMU staff	3 people	500,000 VND /person x 3 people = 1,500,000 VND	To be included in the investor's contract with stakeholders
	Impact assessment, environmental risk control	PPMU staff	3 people	500,000 VNd /person x 3 people = 1,500,000 VND	To be included in the investor's contract with stakeholders
	Environmental Monitoring	PPMU staff CSC staff	8 people (3 PPMU staff and 5 CSC staff)	500,000 VND /person x 8 people = 4,000,000 VND	To be included in the investor's contract with stakeholders
	Raising awareness	PPMU staff	8 people (3 PPMU staff	500,000 VND /person x 8	To be included in the investor's

Content		Trainees	Quantity	Cost (VND)	Fund
	and accessing to the environmental legal system	CSC staff	and 5 CSC staff)	people = 4,000,000 VND	contract with stakeholders
	Training and capacity building for environmental monitoring	CSC staff	5 people	5 people x 1,000,000VND/person = 5,000,000 VND	To be included in the investor's contract with stakeholders
Training for CSB		CSC staff	2 people/ 1 commune x 1 commune = 2 people	2 people x 1,000,000 VND/person = 2,000,000 VND	To be included in the investor's contract with stakeholders
Total (VNĐ)				28,000,000	

Table 7-12: Summary of total cost for conducting Environmental and Social Monitoring Plan

No	Monitoring content/ Implementing period	Implementing responsibility	Cost (VND)
I	Construction period	The agency has sufficient legal status and hired by Project Owner	**125,922,000**
II	Operation period	PPMU	83,681,000
III	Training, capacity building	PPMU	28,000,000
	Total (I+II)		**237,603,000**

ii) Estimated cost for social monitoring

Estimated cost for social monitoring has been detailed in the independent documents (RAP and EMDP)

7.3.5. Monitoring report requirement

Social monitoring report requirement has been detailed in independent documents (RAP and EMDP)

Reports will be made during supervision programs, gathering reports on impacts or citizen's recommendation about the sub-project. Evaluating effectiveness of minimization measures applied.

Table 7-13: Type of reports on the social and environmental supervision

Responsibility	**Type of Report**	**Report content**	**Frequency of report submission**	**Submitted to**
Contractor	Report on Accident/incident	Gathering information about accident and incident	Within 24 hours from occurance	Project Managment Unit, Construction Supervision Consultant
	Report on violation	Supply information about social and environmental management regulation breach	Within one week from occurance	Project Managment Unit, Construction Supervision Consultant
	Report on revelation	Noting and reporting to the authority about the discovered relics and tombs	Within 24 hours from discovery	Project Managment Unit, Supervision consultant and Department Tourism, Information and Culture
	Report on implementation of ESMP	Report on solution to minimize the impact on society and environment	Monthly	Project Managment Unit
Construction Supervision Consultant	Report on implementation of solution to minimize the impact on society and environment	- Evaluating implementation of solution to minimize the impact on society and environment of contractors - Result of resolving incident and measures to overcome the shortcomings of previous reports	Monthly	Subproject Managment Unit
Independent Environmental Consultant	Report on independent supervision of social and environmental security	- Results of construction site investigation -Supervision results based on public -Summarising supervision results of construction supervision consultants -Environmental supervision results	Every six months or every three months	Subproject Managment Unit and WB

Responsibility	**Type of Report**	**Report content**	**Frequency of report submission**	**Submitted to**
		-Evaluating implementation results of ESMP and proposals		
Subproject Managment Unit	Report on environmental activities of subproject	Implementation results of ESMP	Every six months	CPO and WB

7.4. Implementation arrangement ESMP

7.4.1. Agencies and responsibilities

Table 7.14: The role and responsibility in the implementation ESMP

Unit	**Role and responsibility**		
	Project's Preparation	**Project's implementation**	**Project's operation**
MARD CPO	Guiding safety policy staffs of Provincial Project management Board during the preparation period of Inspection report the environmental and social impact assessment. Review and contribute the ideas for report submited by Provincial Project Management Board	Guiding the staffs of Provincial Project Management Unit (PPMU) to carry out the environmental and social management plan during construction time. Supervising progress of the subproject during construction time. Gathering the 6months reports on environment from PPMU	Guiding safety policy staffs of Provincial Project management Board to carry out the environmental and social management plan during the first operation year; Supervising progress of subproject during the first operation year; Gathering the reports on environment from PPMU;
Provincial People's Committee	Guiding safety policy staffs of Provincial Project management Board during the preparation period of Inspection report of the environmental and social impact assessment. Review and contribute the ideas for report submited by Provincial Project Management Board	Project Owner takes the highest responsibility on environmental activities of subproject during the construction time	Project Owner takes the highest responsibility on environmental activities of subproject during the operation time including the implementation ESMP.

Unit	**Role and responsibility**		
	Project's Preparation	**Project's implementation**	**Project's operation**
Provincial Project Management Board	Hiring consultant and take the general responsibility on preparation ESIA and submit for approval; Guarantee the officers must be trained completely in environmental issues;	Taking the responsibility on implementing ESMP in pre-construction and construction periods; Guarantee the detail of contract and bidding documents including environmental requirements; Conducting the investigation and supervision environmental issues during construction time; Cordinating Environmental Monitoring Reports to CPO;	Taking the responsibility on implementing ESMP in the first operation year; Conducting the investigation and supervision environmental issues in the first operation year; Assist project owner in giving out environmental requirements in operation procedure and maintenance project;
People's Committee of District	Approving the Environmental Protection Committment (CEPs) of subproject in accordance with legal regulations of Vietnam Government;	Supervising the implementation of ESMP via their internal supervision system;	Supervising the implementation of ESMP via their internal supervision system;
Community Supervision Board (CSB) and members of community	Participating in activities of consultation, determination and preparation project's works; Having the ability to contribute the ideals to environmental impact reports when these documents are introduced to them;	Participating in environmental supervision activities as per Vietnam laws and attending the training cources.	Participating in environmental supervision activities as per Vietnam laws and attending the training cources.
Execution supervision consultant	Participating in activities of consultation, determination and preparation project's works; Having the ability to contribute the ideals to environmental impact reports when these documents are introduced to them;	Undertaking the training cources on environment for Supervision Consultant staffs Participating in supervising environment accoring to approved ESMP in ESIA report Preparing the monitoring report and submitting to PPMU	Participating in supervision activities on construction as per Vietnam laws and attending the training cources.

Unit	**Role and responsibility**		
	Project's Preparation	**Project's implementation**	**Project's operation**
Construction Contractor	Participating in activities of consultation, determination and preparation project's works; Having the ability to contribute the ideals to environmental impact reports when these documents are introduced to them;	Preparing the specific report on environmental supervision in the project field to meet the general requirements of the subproject's ESMP; Allocating sufficiently the labor source to meet the obligatory requirements and regulations of ESMP on the field;	Participating in construction activities, supervision as per Vietnam regulations Participating in training cources.

7.4.2. Assessment of existing environmental and social management practice and capacity for dam management

Currently, Dai Thang Reservoir is managed and operated by water resource exploitation Co. Ltd company (in Lac Thuy district, Hoa Binh province). However, operational staff in the Company isonly focusing on monitoring, maintainance of the system. Environmental and social management practice has not been carried out properly yet. The awareness of the staff in company on safety policies of World bank is still limited.

Also, human activities can impact on the headwork complex of Dai Thang Reservoir, for example : Poultry activities on the dam face, crop or rice planting in corridor zone of the system. In addition, people's committee in An Binh commune and Water resource exploitation Co. Ltd Company in Lac Thuy District can't control or manage those activities in advanced. The results, dam is being permeated, causing some risks on stabilization of the dam.

Therefore, in order to ensure the safety of the headwork system after rehabitating and upgrading, it requires an authorized staff to operate and maintain. Besides, it is neccessary to conduct some training program on improvement of people's awareness about socio-environmental safety, relating to this headwork complex. It can done by strictly linking environmental and social management plan with Dam safety management.

On the other hand, the training program for the leaders in 4 villages (Dai Dong, Dai Thang, Thang Loi, Duc Binh) in An Binh commune and representatives of local people could help on enhancement of environmental – social management practice and capacity for dam management in case of Dai Thang Reservoir.

7.4.3. Building capacity and improves the knowledge on the environmental and social protection training/coaching programs

To increase the capacity and technique in environmental management for staffs of Project Management Unit ubproject Management Board, organizations and relevant individuals, the Subproject Management Board conduct the following training contents**:**

- Heighten capacity in environmental management and supervision;

- Communication to increase awareness in environmental protection;
- Training on preventing and fighting fire;
- Training on environment regulations and standards;
- Training on environmental health and labour safety measures, environmental safety
- Training on enhancing awareness of dam safety;
- Training on enhancing awareness of infectious disease;
- Training on enhancing awareness of gender equality;
- Training on enhancing awareness of ethnic minority development.

7.5. Community development need assessment

Community empowerment proposals are based on surveys, consultation and investigation of current socio-economic state of An Binh in general and 4 hamlets in the sub-project area in particular. Negative and positive impacts of sub-project are fully considered and discussed with local people.

As a typical area of sub-project with 70% of ethnic minority people whose main livelihoods are farming and forestry, during consultation process, the consultation agency have somehow grasped mainly demands of local people in the project area.

Regarding negative impacts of sub-project such as permanent and temporary land acquisition, water cut in the production season which affect daily lives of local people and ethnic minority group during project implementation, some demands of local people are summarized as follows:

1. Demand on Ethnic Minority development.
2. Demand on Gender development
3. Demand on enhancement of production improvement, joining in Encourage agriculture.
4. Demand on movement in structure employment.

It is easy to conclude that above demands closely relate to implementation of subproject. Therefore, with a demand, a proper action plan is indicated. Following by 4 demands, independent reports are also worked on such as Ethnic Minority Development Plan (EMDP) including action plan for EMDP; Resettlement Action Plan (RAP) including action plans for resettlement, movement in structure of employment for households being lost of landuse; a gender action plan is also discussed in the reports (See in attached reports for more details).

The improvement of the integrated crop management skills for local people in the region benefited by the project will be presented as follows: :

ICM - Integrated Crop Management is considered a suitable measure that helps ensure the ecological stability and sustainability over a long-term period. It is a combination of two integrated management measures: IPM - Integrated Pest Management and INM - Integrated Nutrient Management.

When the sub-projects go in operation, organize workshops and training of IPM officials at commune and village levels in the sub-project area, with the following contents:

+ Distinguish the main and secondary pests

+ Identify the natural enemies of harmful pests and diseases for crops

+ Method of detecting harmful pests and diseases

+ Understand the impact of pesticides, appropriate use of pesticides

+ The pest control techniques according to the principles of IPM

+ Advanced farming techniques

+ Requirements to manage pesticide packaging after use

- The training program will combine theory and practice in the field. The content can be chosen according to thematic groups: farming, identifying and detecting methods for pests and their natural enemies, IPM techniques in manufacturing, etc.

- Target Training: The technical staffs of cooperatives, village leaders and members. The students will be trained to go back to the farmers in the project area, the implementation of the model

- The size of each class is from 30-45 students, organize classes in commune. Time Learning is in phases under the thematic training, each session can last 3-5 days of both theory and practice

- Lecturer: hiring experts from universities, research institutes, extension centres.

Additionally, the people would like to participate in observation and implementation of subproject, focusing on stage of land reclaim, compensation, support, levelling through social and political organizations in community. These community organizations have functions of observation of the feedback related to activities of the subproject in three phases (pre-construction, construction and operation). With the management and monitoring, these organization could significantly contribute in decision making processes during implementation of subproject, making it properly with local conditions.

PART VIII: PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

8.1. Public consultant objectives:

- Public consultation for Project is required in the ESMP completion process. Community involvement and consultation has been carried out to:
- Provide useful information, the better understanding on subproject, potential impacts and possible improvements for the project;
- Allow the controversial issues appear at initial stage;
- Create opportunities to solve problems early;
- Help to develop transparent procedures to implement proposed project, and to create responsibility and local ownership in project implementation process.
- Operation Policies WB (OP 4.01) on environmental impact assessment requires that affected groups and non-governmental organizations and local notification are informed;
- The participation was activated in the project preparation process under certain conditions and is often recommended as part of the implementation

8.2. Social impact assessment consultation

i) The consultation attendance:

- Commune People's committee
- The affected households

ii) The consultation's content

- Introducing the content, main works of subproject, source of capital for implementation;
- The consultant presents the policies in interests of the effected people, grievance mechanism and solution, compensation policy for each type of land, architectural works and plants, farm produce
- The consultant presents impacts forecast of subproject to resettlement, gender;
- The stakeholders discuss policies in interests and compensation to the effects on land, works, architecture, plants and farm produce.

iii) Consultation method

Immediately starting project preparation, local authorities leadership at all levels of An Binh commune, Lac Thuy district, and Hoa Binh province have been reported about the subproject, the targets and proposed activities of project. The affected households had been invited to consultation meeting was held in commune office to discuss the related contents.

iii) Consultation results:

Table 8-1: Social public consultant

Date	Location	Participant /Number of women	Contents	Participants
05/02/2015	An Binh Commune People's Committee	8/3	Information of subproject Information of headwork system of Dai Thang	-Leader of commune: mr Bui Xuan Dung -Communal authorities Chief of 4 villages in the sub-project area

			Reservoir Predicted social impacts of subproject - Commitment of investors	-Representatives of some households
07/02/2015 & 27/3/2015	Duc Binh village	22/6	Information of subproject Appropriation of farmland and land tenure Potential social impacts and mitigation measures.	-Secretary, Chief of villages - Representatives of households in the village
06/02/2015& 27/03/2015	Thang Loi village	21/8	Information of subproject Information of affected households during implementation of subproject. - Impact of water shortage in a crop and social impacts in implementation process.	-Secretary, Chief of villages - Representatives of households in the village
06/02/2015& 27/03/2015	Dai Thang village	First time: 25/13 Second time: 18/10	Information of subproject Affected households and fraction of affected Ethnic minority - Prediction of cut-off water and other social impact in implementation process.	-Secretary, Chief of villages - Representatives of households in the village
06/02/2015& 27/03/2015	Dai Dong village	1st : 30/14 2nd: 25/8	Information of subproject Socio-economic impacts of subproject - Information of compensation for households of land lost.	-Secretary, Chief of villages Representatives of households in the village

Table 8-2: Social consultant feedback

Date	Location	Feedback content	Responsibity of project owner	Mitigation measures
06/02/2015	An Binh Commune People's Committee	All participants agreed with implementation of subproject Supported plan for female. - Supported plan from project owner for local people in Dai Dong, Thang Loi and Dai Thang villages when they are affected by water shortage in implementation process.	-Commit to provide policies and supported solutions for people in three villages: Dai Dong, Thang Loi, Dai Thang	Follow up the regulation, policy and the law of government. - Make an Ethnic Minority Development plan and notice in gender works.
07/02/2015 & 27/3/2015	Duc Binh village	People in Duc Binh village don't use water from Dai Thang Reservoir so they are not impacted by subproject. - Supported plan for project owner for people who will be lost their land.	Provide compensation plans for people being lost of land use.	
06/02/2015& 27/03/2015	Thang Loi village	Ratio of Muong Ethnic is about 85% All farmland of this village are using water from Dai Thang reservoir. However, due to lack of irrigation water, some households just plant one crop in a year. - People agreed to implement subproject.	- Ensure not to create social evil in implementation phase.	- Make plans on management and eduction for workers.
06/02/2015& 27/03/2015	Dai Thang village	People in this village have low income. Main activities are	- Ensure to supply irrigation water in a crop season during	Project owner supports and ensure income for people suffering irrigation

		agrio-forestry activities. -Ratio of poverty: 23%. Muong ethnic is major. - They, specially female agree to implement this subproject.	implementation phase.	water in a crop season. - Participate in implementation phase as workers to improve their income.
06/02/2015& 27/03/2015	Dai Dong village	-There are 136 households lossing land, in which there are 121 Muong ethnic households in implementation process. People agree to implement this subproject. Wish to receive the support from project owner in water shortage stage. Affected people of Ethnic minority is high. - Wish to participate in implementation phase of this subproject.	- Ensure not to impact on ethnic minority.	Supported plant from project owner. Manage machine and truck and workers from outside well.

Thus, the results of the consultation showed that all of people in project area are agreed with the implementing the sub-project.

100% of consulted Ethnic minority people support the project performance

8.3. Environmental impact assessment consultant

8.3.1. Summary of public consultancy activities deployed in the ESIA preparation stage

Public consultation and information dissemination are impelemented in the ESIA and EIA preparation stage of sub-project. During detailed design, Investor is Hoa Binh Project Management Unit will consult with community and the authority, inform them about the current state of the sub-project and the measures will be deployed to minimize the potential negative impacts to the natural environment of the area. During the consultation, if necessary, the investor will adjust the design consistently, plan measures to reduce the negative impact announced to the local, especially people directly effected from the sub-project.

The objectives of the consultation: The contents of consultation: (i) Information about Project/sub-project (General information about the project, the scope, the components, the positive and negative effects and the minimization measures, the sub-project implementation plan. (ii) Discuss the historical risk/accident happened on the environment and society in the past from the construction. (iii) The key construction activities and operation issues. (iv) The potential impacts to the natural environment which is important in the construction phase and operation. (v) Mitigation measures, environmental management plans and social. (vi) Monitoring and observation (vii) Mechanism for settlement of complaint and claim.

Constultation programe:

+ Step 1: The owner inform to participant about projects and sub-projects.

+ Step 2: The environmental experts notify positive and negative impacts to environement due to sub-projects' implementation.

+ Step 3: Obtaining advice from local athorities, people in the Project area who are benefited or not benfited.

The sub-project's environment consultant has worked with the investor to implement survey and consultancy on Februảy 5th, 2015.

Content of consultancy of the sub-project with relevant branches, representatives of Department Natural Resources and Environment, of Lac Thuy District People's Committe, of Division of Agriculture and Rural Development, of The Fatherland Front Committe, commune's representative, irrigation and transportation officers, communal secretary.

In the public consultancy on the environmental impact assessment of the sub-project, Project Management Unit and the environmental consultant use deep interrogation, direct interview of some household in the benefited and affected area. One hundred per cent of interviewed households agrees with the sub-project implementation and want contractors and the investor seriously ensure the society and natural environment of the area.

In order to prepare The environmental impacts assessement report, The environmental and social safety policy report for the sub-project, the sub-project Management Unit sent relevant public consultation minutes and summay of all ítems as well as minimization measures to communes on 17/03/2015: An Binh commune, An Binh Fatherland Front Committee. Through the minutes, these organizations totally agree with the sub-project implementation and recommend that branches and organization at all level need supervise and monitor as proposed in submitted reports.

Table 8-3: Summary of the consultation process

Date	Location	Quantity of participant/Number of female	Participants
05/02/2015	An Binh commune People's Committee	20 /5	-Chief of Project Management Unit - Environmental consultant -Officer of Water resource division of the Environment and Resources Department - Communal authorities - Chief of 4 villages in the sub-project area -Representatives of some households
In the morning of 06/02/2015	Thang Loi village cultural office	25/4	-Representatives of the investor - Environmental consultant -Secretary, Chief of villages - Representatives of households in the village
In the afternoon of 06/02/2015	Dai Dong village cultural office	20/8	Representatives of the investor - Environmental consultant -Secretary, Chief of villages - Representatives of households in the village
In the morning of 07/02/2015	Dai Thang village cultural office	22/6	Representatives of the investor - Environmental consultant -Secretary, Chief of villages - Representatives of households in the village
In the afternoon of 07/02/2015	Duc Binh village kindergarten	18/7	Representatives of the investor - Environmental consultant -Secretary, Chief of villages - Representatives of households in the village

8.3.2. Summary of feedback from public consultation in the ESIA preparation

a. Results of the public consultation

Results of the public consultation and information dissemination of The Environmental and social impact assessment advisory unit, project management unit (PPMU Hoa Binh), the People's Committee, Fatherland Front Committee of the communes, towns in the sub-project area, with the following results:

100% of all participants agree to perform sub-project "Upgrading and reparing Dai Thang reservoir" because due to Dai Thang reservoir is degraded, people are lacked of irrigation water in one year. Dai Thang reservoir is the only water source for 3 communes: Dai Dong, Dai Thang and Thang Loi. For Duc Binh village, though local people are not benefited from the reservoir, they are affected by water spilling. The construction site is located on the

village, it is impacted directly from the process. However, people are agreeing in improving dam safety so that people are able to produce and live safely.

Acclaim the sub-project and investor held meetings to consult the people, communal authorities, help people get the information correctly and propose their opinion so that the project will bring high efficiency.

Agree on the social and natural environment impact and minimization measures given by the environment consultant. Below are summary of some typical feedback related to the the sub-project construction.

Table 8-4: Summary of feedback related to the project implementation

Date	Location	Feedback/issues arising	Responsibility of project owners	Proposed minimization measures
05/02/2015	An Binh Commune People's Committee	-Mr Vu Van Doan: need to widen underneath part, reinforce concrete roof of the building about 10m so that people can widen the 1,2km road to the dam	-Will re-consider the design.	
05/02/2015	An Binh Commune People's Committee	-Chief of Dai Thang village: need to manage strictly the operation of the severvoir.		
05/02/2015	An Binh Commune People's Committee	Mr Quach Doanh Nam: need to ensure the environmental issue for the surrounding area		
05/02/2015	An Binh Commune People's Committee	Mr Bui Xuan Hoang: agrees with the sub-project construction		
06/02/2015	Thang Loi village cultrure office	Citizen: Try to avoid risk of transportation accident.	Follow seriouly proposed plan in the environmental mornitoring plan on transportation accident management.	Transportation must avoid the rush hours ỏ school time, using machinery with permitted using duration, there must be cover for vehicles transporting materials.

Date	Location	Feedback/issues arising	Responsibility of project owners	Proposed minimization measures
06/02/2015	Dai Thang village cultrure office	Citizen: during the construction, dust and noise may be arised by vehicles. Though construction area is seperated from residential area, it still influence to the environment.	Will mention the environment protection request in tendering document, request contractors to follow in order to ensure the environment for people	- Use vehicles with permitted using duration, ensure the noise and do not use too many vehicles at one time. - In case of dust arising on the road of transporting materials, water pouring must be done
07/02/2015	BìnhDuc Binh village kindergarten	Citizen: due to there are more workers, solid waste and domestic sewage are also increasing leading to the pollution in the area	Request contractors to follow strictly relevant measures to sure living condition for workers	- Build camp site as required -Need to have moblie toilets or use household's toilets. - Solid waste and domestic waste must be collected within the day and transported to the regulated place
06/02/2015	Thang Loi village culture office	Citizens: ensure construction progress to avoid effecting to the second season irrigation water.	Supervise strictly progress of contractors	Request contractors to follow proposed plan

8.4. ESIA disclosure

Information disclosure: According to the World Bank's policy on access to information, all draft safeguard instruments, including the ESMP/ESMoP, are disclosed locally in an accessible place and in a form and language understandable to key stakeholders and in Vietnamese and English at the CPO and InfoShop before the appraisal mission. ESMP is locally disclosed at the sites and in the Vietnam Development Information Centre of the World Bank in Hanoi

The report of ESIA of the sub-project will be published in Vietnamese version on the website of the Ministry of Agriculture and Rural Development, CPO, People's Committee of Hoa Binh province. ESIA summary will be sent to the Department of Natural Resources and Environment of Hoa Binh, Lac Thuy District People's Committee, the CPC An Binh to the community and interested organizations can access, monitor the plan of ESMP implement.

The report of ESIA of the sub-project in English will be published on Information Centre of the World Bank in Hanoi

PART IX: CONCLUSION, RECOMMENDATION AND COMMITMENT

9.1. Conclusion

ESIA report for "Rehabilitation and improvment of headworks of Dai Thang reservoir" includes the followings:

(1) This sub-project brings many benefits in terms of irrigation for the people in the region, namely: enhancing irrigation for agricultural activities, avoiding flood in downstream area.

(2) The process of preparing the project requires clearance and land acquisition, including temporary and long-term use during the implementation of sub-project but not strong impact on the surounding environment. This phase only reduce the forest cover of the area around Dai Thang reservoir.

(3) The process of sub-project construction is taken place in the dry season, then the flow will not be altered and the aquatic ecosystem in the reservoir area is not negligible affected. Since management offices are newly built, volumes of construction materials are very large. In addition, the heavey frequency during this phase has powerful impact on the atmosphere, the radius of influence of dust arises from the transportation of materials is about 700m, effecting the health of residents living along the way (from Lac Thuy district to construction area is about 20km). Other impacts from wastewater, solid waste can be considered small and localized. The presence of workers (about 26 people per day) in short period of time can affect the safety. order and social evils.

(4) During the operation phase, the works is put into operation, no more waste generated, the impact on the environment and society is negligible.

(5) Measures to overcome the negative effects on the environment of the sub-projects can be applied as reasonable and feasible technical measures to control pollution, such as collection and disposal of solid waste, waste hygiene, domestic sewage, water spray to reduce dust ... These techniques are combined with the management and proper operation of the technical facilities/construction equipment, output environmental indicators will meet to the standard regulations (TCVN) and therefore, may limit the negative impact of the sub-project activities on the environment.

(6) The negative impact on the environment of the project can be completely overcome by the application of appropriate techniques and the feasibility to control pollution, such as collection and disposal of solid waste, domestic waste, domestic sewage, water spray to reduce dust ... By the technical measures which, combined with the management and proper operation of the technical facilities/construction equipment, the target environment that will

meet the current criteria specified (Vietnamese Standard) and therefore, the negative impact of project activities on the environment is negligible.

(7) The compensation, clearance for households in the affected areas of the construction process repairs are presented in a separate report.

9.2. Recommendation:

Recommendations for the sub-projects as follow:

- Implement measures to reduce pollution, especially dust and emisssion pollution may occur from the transportation of materials.

- Implement measures to control pollution and environmental supervision program as proposed in this ESIA report.

- Periodic investigations and field surveys are needed to evaluate the performance of the project. Consult for wider audiences, focusing on the areas of the affected communes by this project.

- Strictly follow the regulations of the State of collecting, processing of waste sources, the impacts on the environment in the operation phase of the project.

- Regularly conduct surveys of termites nest in the dam body for timely remedial measures.

- It is possible to consider the possibility of water supply (through treatment plants) in the near future to ensure a safe water supply and sanitation in rural areas.

- May consider the possibility of enhancing the level of comfort of infrastructure headwork items of Dai Thang reservoir.

- Local governments facilitate Investor to perform compensation and clearance. The District Division of environment and natural resources coordinates with the Department of Environment and Natural Resources of the province to observe annual environmental quality and have appropriate mitigation measures to ensure the quality of the living environment for people in the subproject.

9.3. Commitment of Project Owner:

In order to prevent or otherwise minimize the adverse impacts on natural and social environment during the construction and as well as during the operation of the rehabilitated dam, the Department of Agriculture and Rural Development of Nghe An province as the sub-project owner, hereby commits to comply with the requirements of the Law on Environmental Protection of Vietnam and the policies of th World Bank.

Specifically, the sub-project owner commits to:

i. Conform strictly with the environmental criteria and standards (Vietnam National Technical norms and standards) following the current regulations on environmental quality parameters.
ii. Fully implement all the measures identified in the Environmental and Social Management Plan (ESMP), including the Resettlement Action Plan/Compensation Plan (RAP/CP) and other measures necessary to protect water resources and environment.
iii. Take full responsibility with Social Republic of Vietnam in case of infringements with international conventions, non-conformance of Vietnam standards on Environment and when the environmental problems occur.
iv. Strictly conform with regulations on compensation as regards damages due to the sub-project implementation.

_____

AuthorizedSignature

Department of Agriculture and Rural Development

LIST OF REFERENCE DOCUMENT

1. Report specialized topographical, geological, hydrological subproject"Sub-project Rehabilitation and safety improvement of Dai Thang Reservoir" supplied by The works Center - Hydropower and renewable energy Institute
2. The FS report of the sub-project Sub-project Rehabilitation and safety improvement of Dai Thang Reservoir
3. The report on Resettle action plan for the sub-project Sub-project Rehabilitation and safety improvement of Dai Thang Reservoir
4. The report on EMDP for the sub-project Upgrading and reparing safety of Dai Thang reservoir - Hoa Binh;
5. The report on implementation results of the social and economical development 2005 and 2010;
6. The report on implementation results of the social and economical development 2014 and plan for 2015 of An Binh commnue;
7. The report on Lan use planning as to 2020 and first period land use plan (2011-2015) of An Binh commune, Lac Thuy Distric, Hoa Binh;
8. The report on the social impact of the sub-project Sub-project Rehabilitation and safety improvement of Dai Thang Reservoir
9. The new rural scheme of An Binh commune;
10. Result of the environmental sampling analysis in the sub-project Sub-project Rehabilitation and safety improvement of Dai Thang Reservoir
11. Notes of basic design of the sub-project Sub-project Rehabilitation and safety improvement of Dai Thang Reservoir supplied by The works Center - Hydropower and renewable energy Institute

APPENDIX

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APPENDIX A1: DRAWING OF THE MAIN WORKS

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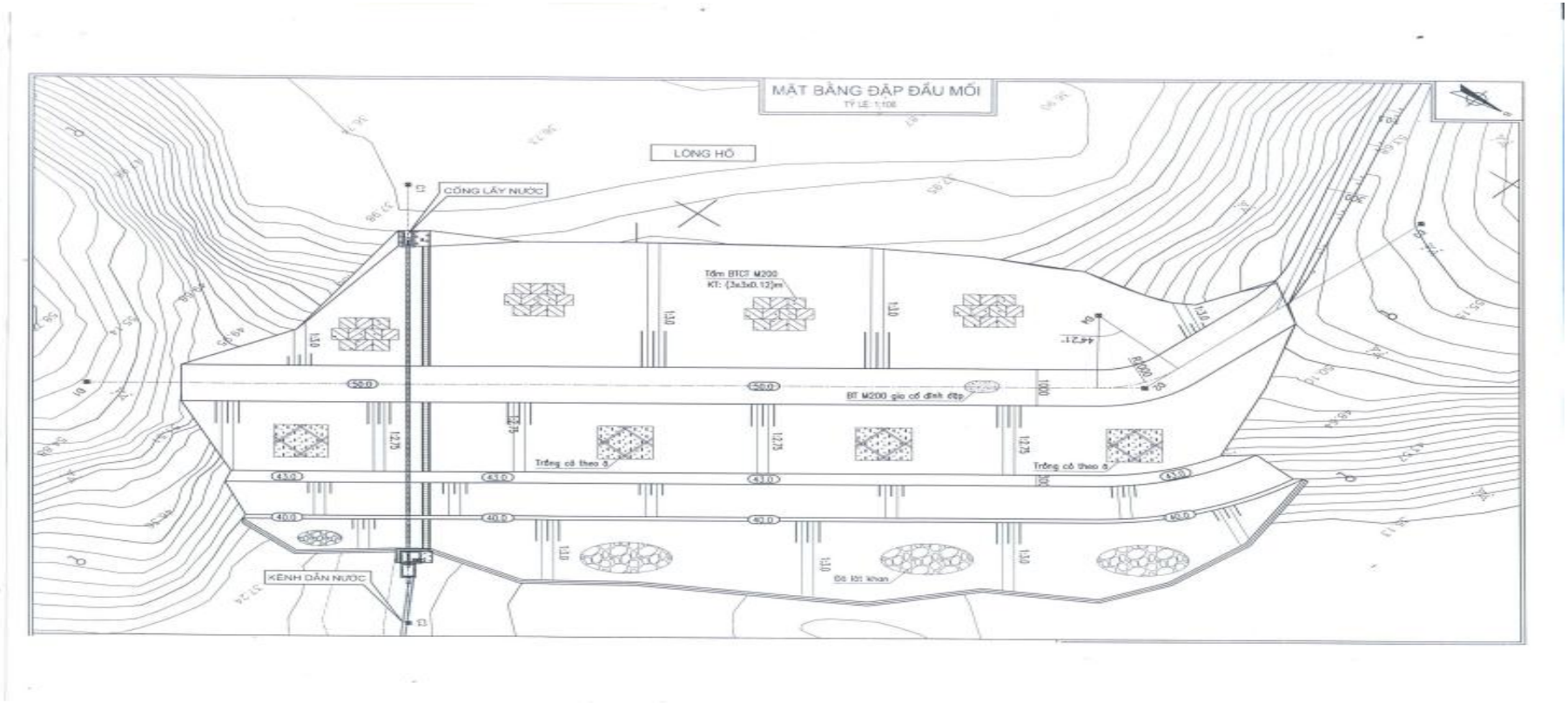
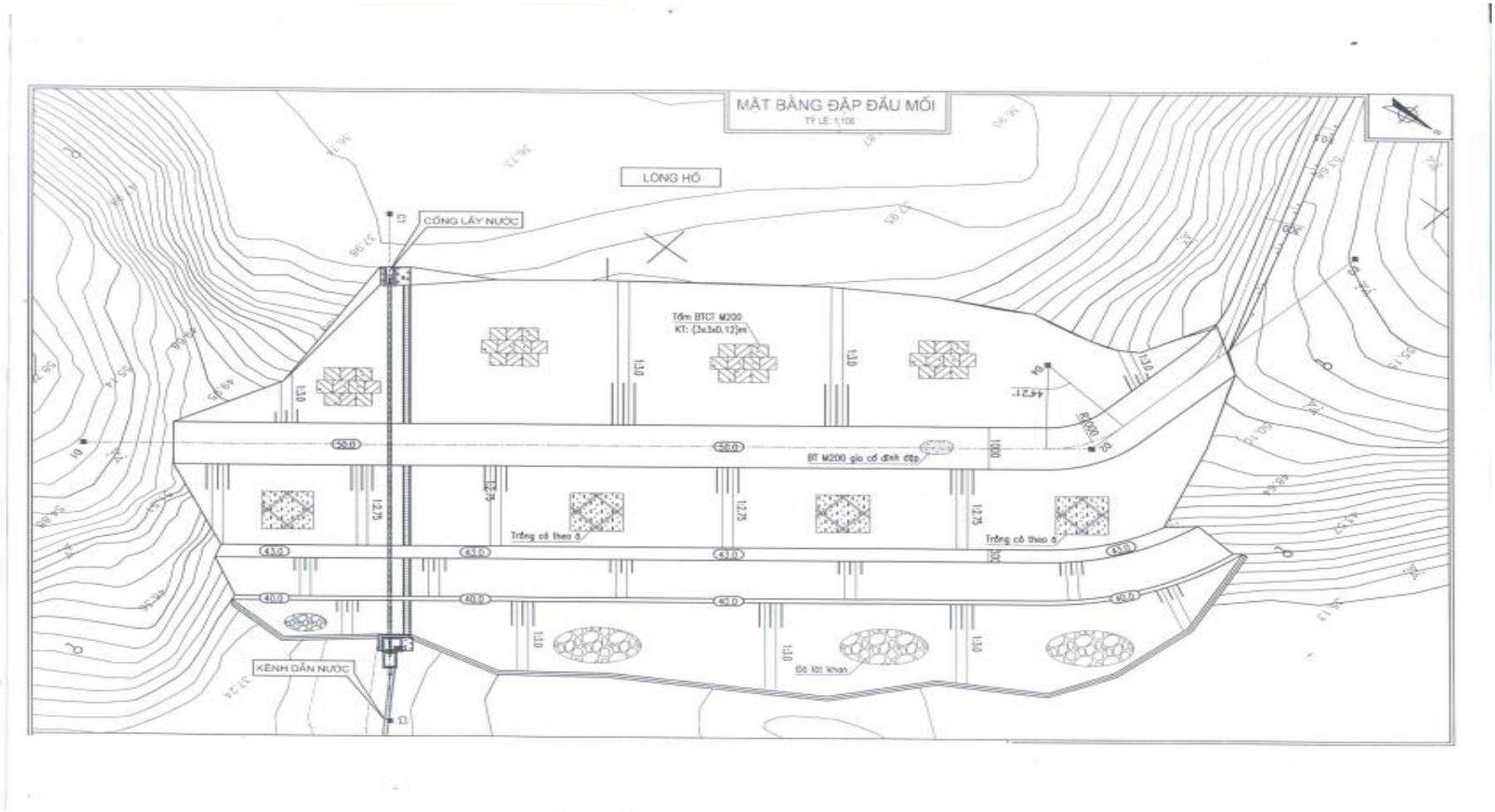
APPENDIX A: ENVIRONMENT

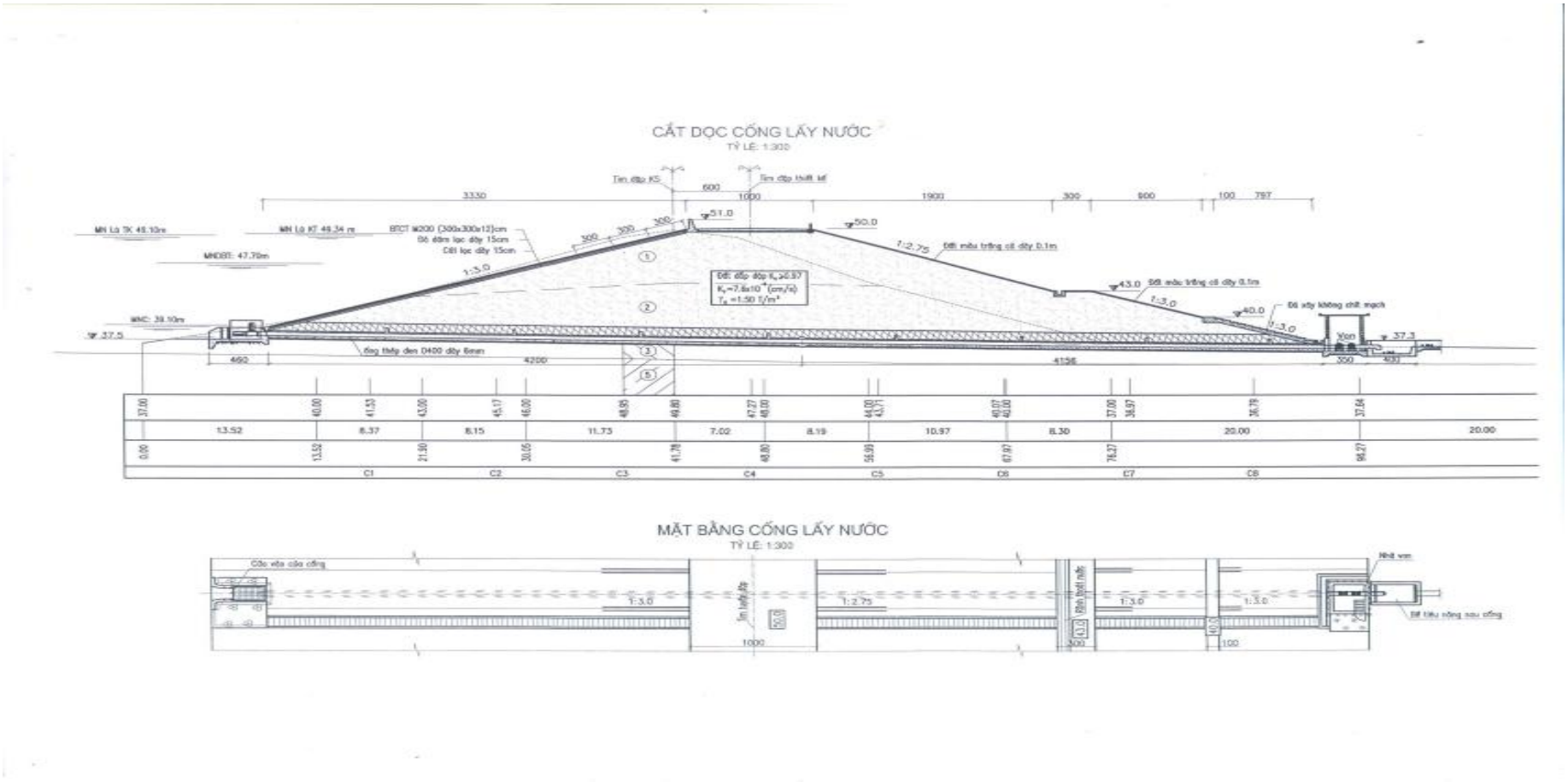
APPENDIX A1: DRAWING OF THE MAIN WORKS



01PL01- figure 01: Facade of the focal dam



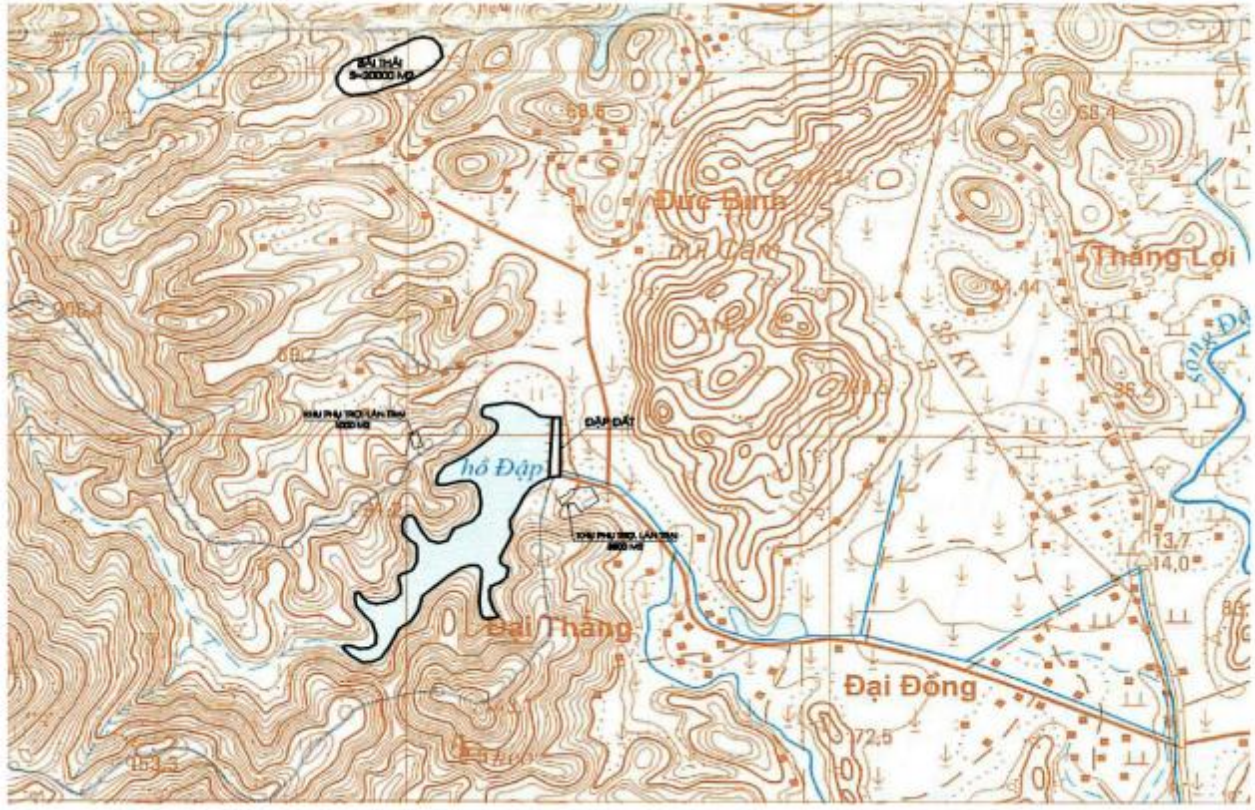
PL01-figure 02: Slice cut of flood overflow



PL01-figure 03: Facade of offtake regulator

APPENDIX A2: TYPE OF MAPS

Figure A2.1: Construction site plan



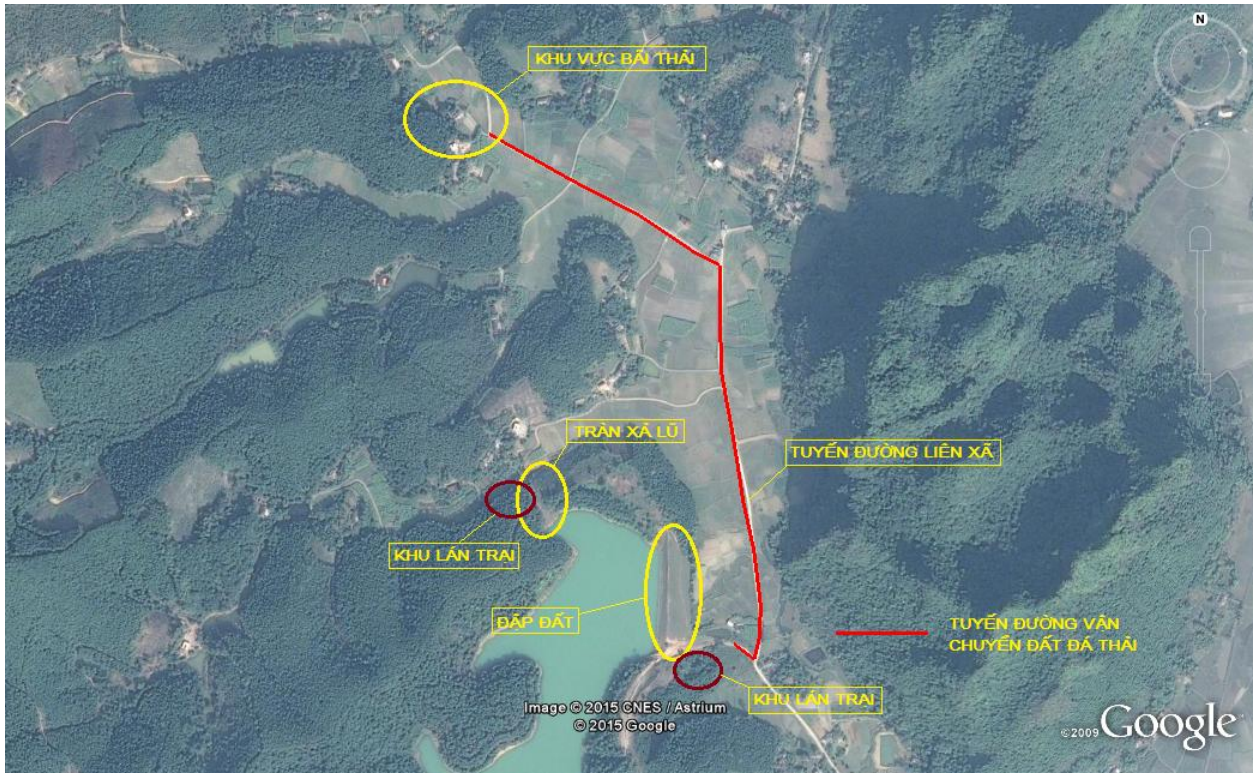


Figure A2.2: Position of auxiliary works in Dai Thang reservoir

APPENDIX A3: POLICY FRAMEWORKS, INSTITUTION AND REGULATION

Applying the legislative framework relating to the land use and land acquisition in development projects

- Law on Land No. 45/2013/QH13 was passed by the NationalAssembly of the Socialist Republic of Vietnam, on November 29th, 2013 .
- Decree No. 43/2014/ND-CP, on May 15th, 2014 guiding implementation of some articles in the Law on Land 2013.
- Decree No. 44/2014/ND- CP, on May 15th, 2014regulating on land.
- Decree No. 47/2014/ND-CP, on May 5th , 2014 regulating on compensation and resettlement assistance when the State recovers land.
- Decree No. 37/2014/ND-CP, on June 30th , 2014 detailing on compensation and resettlement assistance when the State recovers land

- Circular No. 23/2014/TT-BTNMT on 19/5/2014 regulating on land-use rights certificates, Right of house ownership and things belong to land.

Applying the legislative framework relating to the investment project management in construction

- Law on Construction No. 50/2014/QH13 was passed by the NationalAssembly of the Socialist Republic of Vietnam on 18/08/2014.
- Decree No. 15/2013/NĐ-CP on 06/02/2013 regulating on construction quality management.
- Decree No. 207/2013/NĐ-CP dated on 11/12/2013, adjustment and additional regulating on some articles in Decrecc No. 48/2010/NĐ-CP on May 7th 2010 of the Government on contract of construction activities.
- Decree No.12/2009/ND-CP dated 10/02/2009 regulating investment and construction project management.

Applying the legislative framework relating to the intergrated water sources exploration, Forest protection, Cultural heritage protection and biological diversity protection

- Law on Water Resources was passed by the NationalAssembly of the Socialist Republic of Vietnam, on 21/06/2012
- Decree No.42/2012/NĐ-CP, dated 11/05/2012 was passed by The Vietnamese Government regulating on use and management crop land.
- Decree No.112/2008/NĐ-CP dated 20/10/2008 was passed by The Vietnamese Government, regulating on integrated natural sources and environment exploration and protection in hydropower and water resources projects;
- Decree No.120/2008/NĐ-CP dated 01/12/2008 was passed by The Vietnamese Government, regulating on basin management;
- Decree No.72/2007/NĐ-CP dated 07/05/2007 was passed by The Vietnamese Government, regulating on dam safety;

- Decree No.149/2004/NĐ-CP dated 27/07/was passed by The Vietnamese Government, stipulating on licensing of exploration, exploitation and use of water resources, waste water discharge into water
- Law on Forest Protection and Development No. 29/2004/QH11 was passed by NationalAssembly of the Socialist Republic of Vietnam, on 03/12/2004
- Decree No.23/2006/NĐ-CP dated 03/03/2006 was passed by The Vietnamese Government on guiding implementation of the Law on Forest Protection and Development No. 29/2004/QH11
- Decree No.57/QĐ-TTg dated 09/01/2012 was passed by The Vietnamese Government on forest protection and development plan in 2011-2020 .
- Law on Cultural Heritage No.28/2001/QH10 was passed by The NationalAssembly of the Socialist Republic of Vietnam, on 12/07/2001. Aticle13 – Prohibit following activities: Expropriations, falsify cultural heritage; Destroy or cause risk of destroying cultural heritage; unauthorized digging archaeological sites; unauthorized construction, encroachment of historical-cultural attractions.
- Law of Biological Diversity No.28/2008/QH12 The NationalAssembly of the Socialist Republic of Vietnam, on 13/01/2008. Chapter III- Preservation and sustainable development of natural ecology, chapter IV- Preservation and development of scpecies.

National Policies on Dam Safety

- Decree No72 passed by The Vietnamese Goveronment , regulating on dam safety
- Circular No. 34/2010/TT-BCT was passed by Ministry of Industry and Trade on October 7th, 2010 regulating on dam safery management in hydropower construction
- Additional regulations on dam safety at local levels

Policies onthe resettlement

- Decree No. 52/2012/QD-TTg, dated 16/11/2012 regulating on support and orientation career for famer when the State recovers land
- Decree No.84/2007/NĐ-CP was passed by the Vietnamese Government on 25/05/2007 additional regulations on granting land-use rights certificates; land acquisition; implementing land-use rights; settling land claims; and orders and procedures for compensation and resettlement when the State recovers land;
- Circular No. 37/2014/TT-BTNMT dated 30/6/2014 stipulating on compensation and resettlement when the State recovers land
- Other regulations including Circular and Decree on resettlement plan passed by People's Committee of Hoa Binh implementation of some articles in Law on Landuse 2014
- Decree No. 52/2012/QD-TTg, dated 16/11/2012 regulating on job assistance, career training for famer when the State recovers land
- Decree No. 69/2009/ND-CP dated 13/8/2009 was passed by The Vietnamese Government, additional regulating on landuse plan, land revocer, compensation and resettlment assistance.

- - Decree No.123/2007/NĐ-CP, dated 27/7/2007 addition and adjustment regulations in Decree No. 188/2004/NĐ-CP, dated 16/11/2004 stipulating on methods of determining land prices and land price frame
- **Regulations on Gender Equality**

- Decree No. 73/2006/QH11 by The NationalAssembly of the Socialist Republic of Vietnam, on 29/11/ 2006, regulating on gender equality;
- Circular No. 07/2007/CT-TTg 3/5/207 was passed by the Vietnamese Government, stipulating on implementation he law on gender equality;
- Decree No. 70/2008/NĐ-CP dated 4/6/2008 was passed by the Vietnamese Government detailing some articles on gender equality;
- Decree No. 55/2009/NĐ-CP dated 10/6/2009 was passed by the Vietnamese Government, regulating on sactions illegal behaviors relating to gender equality;
- Decree No. 48/2009/NĐ-CP dated 19/5/2009 was passed by the Vietnamese Government, regulating on measures to ensure gender equality;
- Circular No. 191/2009/TT-BTC dated 1/10/2009 was passed by Ministry of Finace, guiding manegment and used finance in activites of gender equality and advancement of Women in Vietnam;
- Circular No. 07/2011/TT-BTP dated 31/3/2011 was passed by Ministry of Justice, guiding mainternace gender equality in staff organization and legal aid activities;
- Circular No. 2351/QĐ-TTg dated 24/12/2010 was passed by the Prime Miniter, approving the national strategy of gender equality in 2011 – 2020;

Legal framework for Ethnic Minorities Development

- - Decree No. 82/2010/ND-CP dated 20/7/2010 was passed by the Prime Miniter, regulating on training activities and teaching ethnic language in schools.
- - Decree No. 60/2008/NĐ-CP dated 9/6/2008 was passed by the Prime Miniter, regulating on defining functions, duties, authorities and organizational structure of Committee for Ethnicminority Affair;
- - Decree No. 06/2007/QD-UBDT dated 12/1/2007 was passed by Committee for Ethnicminority Affair, regulating on communication strategy for phase II of the 135 Program.
- - Decree No. 70/2001/ND-CP regulating that all registration documents of family about property ownership and land use rights must be filled both spouses name
- - Decree No. 134/2004/CP dated 20/7/2004 was passed by the Prime Miniter, regulating on supporting policies productive land, residential land, housing and sanitation for households of poor ethnic minorities;
- - Decree No. 03/2005/QĐ-BNN dated 07/01/2005 was passed by Ministry of Agriculture and Rural Development, stipulating logging to support housing for ethnic minorities, living poor condictions according to Circular No. 134/QĐ-TTg dated 20/7/2004 passed by the Prime Miniter;
- - Decree No. 33/2007/QĐ-TTg dated 05/3/2007 was passed by the Prime Miniter, policy supports the implementation of intensive migration, resettlement of ethnic minorities;
- - Decree No. 32/2007/QĐ-TTg dated 05/3/ was passed by the Prime Miniter, regularitng on loans for ethnic minority extremely poor households to develop production;

- - Decree No. 1592/QĐ-TTg dated12/10/2009 was passed by the Prime Miniter, regulating on continueing to implement policy supports for crop land, residential land, housing and sanitation for households of poor ethnic minorities;
- - Decree No. 05/2007/QD-UBDT dated 06/9/2007 was passed by Committee for Ethnicminority Affair, regulating on approving three ethnic minority and mountainous areas based on the development status
- - The Cercular No. 06 dated 20/9/2007 was passed by Committee for Ethnicminority Affair, guiding supporting services, improve people's livelihood, technical assistance to improve their knowledge of the law, according to Decree No. 112/2007/QD-TTg

Regulation on poverty reduction

- Decree No.33/2007/QD-TTg dated 20/7/2007 was passed by the Prime Miniter, policy support to improve the knowledge of the law, according to phase 2 of the 135 program;
- Cericular No. 06 dated 20/9/2007 was passed by Committee for Ethnicminority Affair, guiding supporting services, improve people's livelihood, technical assistance to improve their knowledge of the law, according to Decree No. 112/2007/QD-TTg
  - Decree No.05/2007/QD-UBDT dated 06/9/2007 was passed by Committee for Ethnicminority Affair, regulating on approving three ethnic minority and mountainous areas based on the development status

Technical Regulation and Standard on Environmental protection in Vietnam

- Water Environment:
- QCVN 01:2009/BYT: National technical regulation on the drinking water quality;
- QCVN 02:2009/BYT: National technical regulation ondomestic water quality;
- QCVN 08:2008/BTNMT: National technical regulation onsurface water quality
- QCVN 09:2008/BTNMT: National technical regulation onground water quality;
- QCVN 10:2008/BTNMT: National technical regulation onwater quality on coastal areas
- QCVN 14:2008/BTNMT: National technical regulation on domestic wastewater quality,
- TCVN 5502:2003: water supply – quality requirement
- TCVN 6773:2000: Water quality – Water quality using for water resources
- TCVN 6774:2000: Water quality – water quality for aquaculture protection
- TCVN 7222:2002: Water quality – domestic water quality concentration
- Air and soil environment:
- QCVN 05:2008/BTNMT: Air quality – National technical regulation on the surrounding air quality
- QCVN 06:2008/BTNMT: Air quality – permissible limits of harmful substances in the surrounding air environment;
- QCVN 07:2008/BTNMT: Air quality – threshold of toxic substances in the air;
- Waste solid management:
- QCVN 03:2008/BTNMT: National technical regulation on permissible limits of heavy metals in the soil;
- TCVN 6438:2001: Vehicles on the road - the maximum permitted emission of gases,
- TCVN 6696:2009: Solid Waste - sanitary landfill. General requirements for environmental protection;

- QCVN 07:2009 : National technical regulation on for the hazardous wasteclassification;

▪ Vibration and noise:

- QCVN 27:2010/BTNMT-National technical regulation on vibration(replace the Standard TCVN 6962:2001 – vibrationdue to the construction and plant - the maximum permitted levels in public areas and residential areas);
- QCVN 26:2010/BTNMT-National technical regulation on noise (replace the Standard TCVN 5948:1999 Acoustics - Noise from vehicles during acceleration - the permitted level);
- TCVN 5949: 1998 Acoustics - Noise in residential and public areas - the permitted level.

▪ Health and Labor Safety:

Decree No. 3733/2002/QĐ-BYT was passed by Misnistry of Health, dated 10/10/2002, regulating on the applications of articles 21 about health and labor safety standard relating to microclimate, noise, vibration, chemical compound – permitted levels in working environment.

APPENDIX A4: THE RESULT OFENVIRONMENTAL AND SOCIAL SCREENING FOR SUB-PROJECT

Table – A4.1: Eligibility Screening

Screening Questions	Yes	No	Remarks, (If yes)
1. Does the proposed sub-project lead to an increase in the dam height and/or reservoir's design storage capacity?		x	
2. If the answer of the question 1 is yes, does the increase is not necessary from safety management perspective?		x	
3. Does the proposed sub-project encroach on a critical natural habitat, a protected area of natural habitat, a national park of nature or a nature reserve and would lead to temporary or permanent acquisition land in that habitat, park or reserve?		x	
4. Does the sub-project displace, disfigure or render inaccessible any structure or site of great cultural or historical value to the country, to an ethnic group or to the local community.		x	
5. Does the sub-project use land that is currently occupied or regularly used for natural forest areas, defensive forest or leads to a change in the land use of forest lands during project implementation?		x	

Conclusion:

The subproject "Rehabilitation and safety improvement of Dai Thang reservoir" is eligible

The proposed subproject is in eligible to be financed under DRISP

Table – A4.2: Screening and Environmental Categorization

Screening Questions	Yes	No	Remarks
1. Does the subproject have the potential to cause significant adverse impacts to natural or critical natural habitats?			
Leads to loss or degradation of sensitive Natural Habitats such as: land and water areas where (i) the ecosystems' bio-logical communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions.		No	Impact on water and soil sources of the sub-project is not considerable (due to the increasing of emission such as solid wastes, domestic waste-water in the construction process of 50 workers). The native species are living in areas far away from the sub-project so they will not be affected by the subproject operation. At the place human activities have not significantly changed the basic eco-functions within the scope of project, the construction and operation processes have not changed this eco-system.
Leads to loss or degradation of Critical natural habitat, i.e., habitat that is legally protected, officially proposed for protection, or unprotected but of known high conservation value[1].		No	In the subproject area, there are no natural reserves, sacred forest or species in danger of extinction. The project performance does not affect the general biodiversity of the area.
2. Does the subproject have the potential to cause significant adverse impacts to physical cultural resources?			
Leads to loss or degradation of physical cultural resources (PCR)[2].			The project has not exerted any impact on historical relics because locations of works are far from the historical relics, temples, churches and not violate the freedom of religion of the local residents.
Potentially results in a contravention of national legislation, or national obligations		No	Project on rehabilitation and improvement of Dai Thang

[1] Critical habitats include existing protected areas and areas officially proposed by governments as protected areas (e.g., reserves that meet the criteria of the World Conservation Union [IUCN] classifications, areas initially recognized as protected by traditional local communities (e.g., sacred groves), and sites that maintain conditions vital for the viability of these protected areas. Sites may include areas with known high suitability for bio-diversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species.

[2] PCR is defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. They may be located in urban or rural settings, above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community.

Screening Questions	Yes	No	Remarks
under relevant international environmental treaties and agreements, including the UNESCO World Heritage Convention or affect sites with known and important tourism or scientific interest.			reservoir headworks complex is completely complied with the laws of Vietnam. No sensitive areas are located at An Binh commune - Lac Thuy district where is heavily affected by Dai Thang Reservoir. Therefore, it is not affected by the rehabilitation and improvement of Dai Thang Reservoir's dam.
3. Does the subproject have the potential to cause significant adverse impacts on the lands and related natural resources used by ethnic minorities?			
Potentially result in impacts on lands or territories that are traditionally owned, or customarily used or occupied, and where access to natural resources is vital to the sustainability of cultures and livelihoods of minority peoples. Potentially impact the cultural and spiritual values attributed to such lands and resources or impact natural resources management and the long-term sustainability of the affected resources.	Yes		Since many ethnic minorities are living in the sub-project area, accounting for 50.2% and 70.1% of total population of the commune and total population of the project area, respectively. The sub-project performance may make the construction water be suspended and malfunctioned to cultivate one crop of 223 Muong ethnic households from 03 hamlets, namely Dai Dong, Thang Loi, and Dai Thang.
4. Does the subproject have the potential to cause significant adverse effects to populations subject to physical displacement?			
Leads to physical displacement of populations dependent upon lands or use of specific use of resources that would be difficult to replace or restore? Otherwise lead to difficult issues in the ability of the subproject to restore livelihoods?	Yes		At the time of construction, the area is sparsely populated. Now, however, many people have moved to live in lowlands. The project performance will have a long term impact on 15, 935 m^2 of residential land, agricultural land and forest land of 12 households in the village Duc Binh, including household whom residential land, buildings and structures on residential land are seriously affected. However, such household is eligible for field relocation in the remaining residential land Therefore, the sub-project must prepare a Resettlement Action Plan under OP 4.12 of World Bank.

Screening Questions	Yes	No	Remarks
5. Does the subproject entail the construction/rehabilitation of a large dam?			
Does the subproject require construction/rehabilitation of a dam that is: • 15 meters or more in height • between 10 and 15 meters in height with special design complexities--for example, an unusually large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials. • under 10 meters in height but expected to become large dams during the operation of the subproject?		**No**	The main task of the sub- project is to upgrade the works items (flood spillway, water intake) and newly construct the operation house. With this works, flood spillway has simple structure, Dai Thang Reservoir with small capacity (480,000 m^3, only served for agricultural irrigation in a relatively small area, hence, the Sub-project does not require a large dam construction.
Does the operation of the subproject rely on the performance of: • an existing dam or a dam under construction (DUC); • power stations or water supply systems that draw directly from a reservoir controlled by an existing dam or a DUC; • diversion dams or hydraulic structures downstream from an existing dam or a DUC, where failure of the upstream dam could cause extensive damage to or failure of the new World Bank-financed structure and irrigation or water supply projects that will depend on the storage and operation of an existing dam or a DUC for their supply of water and could not function if the dam failed.	**Yes**		Operation of sub-project only depends on performance of available dam (providing irrigation water for agriculture and operating ecotourism services at the reservoir). - Dai Thang dam is operated separately. Water storage and discharge are not related to any other dam. -**No electric stations** and water supply system to take water from the reservoir and dam is not guided or supported with downstream structure from one available dam. However, the works complex of Dai Thang Reservoir does not require the assessment of group A but caution should be applied because the Bank has an extremely strict requirement to ensure the operation safety of available dam or dam to be built. The bank requires inspecting the dam or new dam, operation performance and O&M procedures; and recommends any repairs or safety measures; the previous evaluations are also re-conducted.
6. Does the subproject entail the chemical for soil treatment?			
Do the formulations of the products fall in World Health Organization classes IA and IB, or are there formulations of products in		**No**	Sub-project does not lead to the purchase or use of pesticides.

Screening Questions	Yes	No	Remarks
Class II?,			
7. Does the subproject have the potential to cause irreversible impacts or impacts that are not easily mitigated?			
Leads to loss of aquifer recharge areas, affects the quality of water storage and catchments responsible for potable water supply to major population centers.		No	The Sub-project does not affect the water storage area which is responsible for providing drinking water to large population centres.
Leads to any impacts such that the duration of the impacts is relatively permanent, affects an extensive geographic area or impacts have a high intensity.		No	The spillway improvement causes no long-term impacts as considered and impacts on large geographical area and the highly intensities impacts for 4 villages of An Binh commune.
8. Does the subproject have the potential to result in a broad diversity of significant adverse impacts?			
Multiple sites in different locations affected each of which could cause significant losses of habitat, resources, land or deterioration of the quality of resources.		No	The spillway improvement is launched by reinforcing flood spillway with inlet bottom structure, spill threshold, slope bottom, stilling basin bottom, and stilling yard behind the basin with M200 reinforced concrete, water slope wall; stilling basin wall; walls of absorption field peppered with stone M100 with materials taken from the centre of Lac Thuy district (20 km from the site), so such construction has no remarkably significant impacts on quality of land resources as well as the surrounding habitat.
Potential, significant adverse impacts likely to extend beyond the sites or facilities for the physical works.		No	The subproject does not cause significantly potential and adverse effects but also widen their effects out of the project of construction works.
Transboundary impacts (other than minor alterations to an ongoing waterway activity).		No	Reinforcement and improvement of other works items or new construction of operation house as well as termite settlement will not cause any remarkable impacts on on-going waterway activities available at the reservoir (aquaculture and ecotourism activities).
Need for new access roads, tunnels,	yes		Currently, the work is supported

Screening Questions	Yes	No	Remarks
canals, power transmission corridors, pipelines, or borrow and disposal areas in currently undeveloped areas.			with a 100 meter long management road connecting the old dam crest to the inter - village roads of An Binh commune to villages of Duc Binh and Dai Dong towards the downstream of the road structure. The operation house is newly built, there should be power transmission corridors, new pipes, the works related to the management of human activities and managing the operation of Dai Thang dam.
Interruption of migratory patterns of wildlife, animal herds or pastoralists, nomads or semi-nomads.		No	The Sub-project performance does not affect or interrupt the cycle of migratory of wildlife, animal herd or people grazing, travellers or semi – residing persons.
9. Is the subproject unprecedented?			
Unprecedented at the national level?		No	Many similar sub-projects have been performed at national level
Unprecedented at the provincial level?	Yes		No project on rehabilitation and improvement of reservoir dam is available in Hoa Binh province.
10. Is the project highly contentious and likely to attract the attention of NGOs or civil society nationally or internationally?			
Considered risky or likely to have highly controversial aspects.		No	Conducting the sub-project is not considered as risk or potentials with the controversial issue.
Likely to lead to protests or people wanting to demonstrate or prevent its construction.		No	The sub-project has not led to the conflicts between the persons agree and person disagrees to construct the project. Sub-project implementation has received great support from local people of 04 hamlets in the area

Table – A4.3: Additional Requirements and Suggested Tools

Does the sub-project entail these environmental impacts?	**Yes**	**No**	**If Yes, Requirements**
Encroachment on historical/cultural areas		x	
Use of explosive and hazardous chemicals		x	
Use of sites where, in the past, there were accidents incurred due to landmines or explosive materials remaining from the war		x	
Construction that could cause significant disturbance to the transportation, traffic routes, or waterway transport?		x	
Increase flood levels to downstream and reservoir sedimentation		x	
Acquisition (temporarily or permanently) of land (public or private) for its development	x		RAP is required
Use land that is currently occupied or regularly used for productive purposes (e.g., gardening, farming, pasture, fishing locations, forests)	x		RAP is required
Displacement of individuals, families or businesses		x	
Temporary or permanent loss of crops, fruit trees or household infrastructure	x		RAP is required
Involuntary restriction of access by people to legally designated parks and protected areas		x	
Ethnic minority groups are living within the boundaries of, or nearby, the subproject.	x		EMDP is required
Members of these ethnic minority groups in the area potentially could benefit or be harmed from the project.	x		EMDP is required
Involve the construction of a large dam (i.e. higher than 15m or more than 3M cubic meter reservoir capacity)?		x	The main task of the sub-project is to upgrade the works items (flood spillway, water intake) and newly construct the operation house. With this works, flood spillway has simple structure, Dai Thang Reservoir with small capacity (480,000 m^3, only served for agricultural irrigation in a relatively small area, hence, the Sub-project does not require a large dam construction. Repair dam with height of +17.9 m DSR is mandatory
Depend on water supplied from an existing dam or weir or a dam under construction?		X	Water in Dai Thang reservoir does not depend on amount of

			water supplied from some dam or existing dam or under-constructing dam.

Summary of Screening (To be filled up after field validation by PMU engaged E&S Consultant:)

The sub-project is approved with the following conditions:

_____

_____

The sub-project is eligible for funding and is required to undertake/prepare the following safeguards activities/documents (Check those that apply).

___Full ESIA

___Resettlement Action Plan (RAP)

___Ethnic Minorities Development Plan (EMDP)

___Dam Safety Plan (DSP)

___Evidence of free prior and informed consultation

___Evidence of broad ethnic community support

___Adoption of Chance Find Procedure

___Adoption of Grievance Redress Procedure

Validate by: _____Date:_____

Table - B.4: Levels of Potential Environmental and Social Impacts to be Addressed

	Does the subproject entail these environmental impacts?	**Assessment**	***Remarks***
1.	Encroachment on historical/cultural areas	No	Although the downstream area is densely populated (population of 3 villages of Dai Don, and Dai Thang and Thang Loi), the religious areas are still located within the safety zone when Subproject Thang Reservoir Headworks are rehabilitated and improved.
2.	Encroachment on an ecosystem (e.g. natural habitat sensitive or protected area, national park, nature reserve etc....)	No	At Lac Thuy District, there is no sensitive natural habitat, reservation zone, conversation park, national park so the sub-project has not affected to the eco-system.
3.	Disfiguration of landscape and increased waste generation	Low	During the period of project construction and performance, there are 50 workers, most of them are local people, frequently extend the spillway everyday so it emits (domestic solid waste (about 13 kg/ day), waste water (about 1.66 m^3/day)). Moreover, the machines for the project (bulldozers, excavators, concrete mixers) also cause the emissions (petroleum and emission). However, the emission level from the workers and machines serving the works is predicted at low level and just in a period of time (7 months - 8 months).
4.	Removal of vegetation cover or cutting down of trees during clearance for construction	Medium	The Subproject requires long-term and temporary use of agricultural land (annual farming land, an occupied area of about 53,000 m^2), forest (forest land allocated to households, occupying an area of about 29,000 m^2) therefore, the preparation phase requires clearance and cutting down of forest trees. The area for long term use occupied by the works is mainly forest land, land for annual crops and public land. This area includes occupied land area of the project itself and ROW there of (under the Ordinance on hydraulic works protection).
5.	Change of surface water quality or water flows (e.g. Increase water turbidity due to run- off, waste water from camp sites and erosion, and construction waste) or long-term.	Low	Sub-project is constructed in a short time (8 months), so its impacts on the flow are not significant. Wastewater and solid waste from camp areas (living activities of workers) may affect the quality of surface water. Construction waste which is mainly building materials and lubricants may cause minimal impacts to surface water quality and flow.

6.	Increased dust level or add pollutants to the air during construction	High	Machines increase the emission amount of dust into the atmosphere during the construction. Because machines are reused so the level of emissions can cause the remarkable impacts on the rest of fresh-air environment. The reinforcement of flood spillway with reinforced concrete structure will increase the amount of local dust within the influence scope. The new construction of operation house also increases the levels of air pollution during construction.
7.	Increased noise and/or vibration	Medium	The level of noise and vibration is usually increasing on daytime mainly when the machines for digging, transporting, filling at the end of dam and probes for finding and handling the termite are starting to operate.
8.	Resettlement of households? If yes, how many households?	No	During the Sub-project performance, only 01 household with residential land is affected, however such household is subject to onsite relocation on the remaining residential land
9.	Use of resettlement site that is environmentally and/or culturally sensitive	No	The sub-project has not selected the location that is sensitive about environment and culture to relocate.
10	Risk of disease dissemination from construction workers to the local peoples (and vice versa)?	Low	Because the construction process gathers about 50 workers/day, divided into two shifts, while the literacy level of the local persons in the region is limited so many disease-related problems will arise. Due to poor sanitation habits of the local people in this area, the diseases easily transmit through drinking water and the air. However, thanks to the policy of maximum use of local manpower of the Project Owner in the construction phase, the risk of transmission to the local population is considered to be negligible.
11	Potential for conflict between construction workers and local peoples (and vice versa)?	Low	Most of construction workers are the local labour. Hence, the possibility of conflict with the local persons is low.
12	Use of explosive and hazardous chemicals	No	No blasting activities in the construction and no usage of harmful chemicals in the termite process.
13	Use of sites where, in the past, there were accidents incurred due to landmines or explosive materials remaining from the war	No	According to the survey, the area under the sub-project (including 4 villages: Dai Dong, Thang Loi, Dai Thang, Duc Binh) has no explosive materials left since the war time.

14	Construction that could cause disturbance to the transportation, traffic routes, or waterway transport?	Medium	Because the work is far from material zones (about 20 km), the construction process will interfere the transport from a large number of vehicles transporting materials.
15	Construction that could cause any damage to the existing local roads, bridges or other rural infrastructures?	Medium	The infrastructure of the Subproject area is poor, inter-communal and inter-village roads are characterized by low loading capacity, which is why transportation of materials or machinery moving during construction may cause damage to this road section.
16	Soil excavation during subproject's construction so as to cause soil erosion	Medium	Dam embankment material is taken at the quarry located at the left hillside of Dai Thang Reservoir, a distance from quarry to dam of approximately 400 m; quarry storage is 50,000 m^2, and meeting needs which may increase soil erosion.
17	Need to open new, temporary or permanent, access roads?	Medium	The project area has relatively favourable traffic conditions. From Highway No. 21 through the town centre Chi Ne into in the provincial Highway 438, turn to provincial Highway No. 479 to An Binh town centre, there are the asphalt and concrete roads with a width of 3 ÷ 5 m. From An Binh commune to the construction foot, there are inter-village roads with concrete structure with road pavement width of an average 3 - 5 m. Currently works have their own managing roads of dam connecting the old dam crest to the inter-village roads in the villages An Binh, Duc Binh, Dai Dong with a 100 m length towards the downstream of the road structure. Therefore, temporary and long-term service road may not be required.
18	Separation or fragmentation of habitats of flora and fauna?	No	The sub-project has just upgraded and extended the spillway so there is no division or diffusion into habitats of fauna and flora.
19	Long-term impacts on air quality	Low	The reused machines and tools can produce the dust into the atmosphere during the construction of spillway, . However, the conditions of air pollution has not lasted for long, the self-cleaning ability reduces the air pollution in the future. Therefore, the sub-project just affects to the air quality in the temporary period.

20	Accident risks for workers and community during construction phase	Low	This is the work for dam rehabilitation and safety improvement project so normal risks for the workers is mainly from usage of machines or accidents relating to water. For the localities, accident risks rarely happen to them because the area for constructing the sub-project is located far from the residential zone (only 1 household under the scope).
21	Use of hazardous or toxic materials and generation of hazardous wastes	low	The machinery or materials serving the construction process usually are construction materials, lubricants. Therefore, less emissions of hazardous waste may be available. During living of field workers, some toxic waste may emit as pathogens in faeces (in the case of workers' sickness or illness) or use of some toxic chemicals (detergents, etc).
22	Risks to safety and human health	Low	In general, the implementation of dam rehabilitation and improvement causes only a low risk to safety and human health due to: − Emissions of dust and noise during construction. − Emissions of lubricants, which may follow the flow into the reservoir through irrigation canal system. Emissions from the workers, affecting water resources (faeces, waste water, etc.)
23.	Acquisition (temporarily or permanently) of land (public or private) for its development	Medium	The agricultural land area of permanent impacts of 10 households is 14.935 m^2, the affected forest land of 2 households is 500 m^2 and temporary area of 2 households is 4,438 m^2. There are 244 households whom 571,297 m^2 area of rice paddy land is so heavily affected that it is impossible to cultivate for 1 season because water consumption for construction is prevailed. However, the Project Owner has planned out a compensation method detailed in the RAP independent report
24	Use land that is currently occupied or regularly used for productive purposes (e.g., gardening, farming, pasture, fishing locations, forests)	Low	The implementation of sub-project relates to the use of existing possessed land or regular use for the production purpose (forestry land allocated to people and woodland annually).
25	Displacement of individuals, families or businesses	Average	Sub-project does not require any household relocation. However, one residential land of 1 household were affected However, the Sub-project requires a large area of land and forestry cultivation from the local people.

26	Temporary or permanent loss of crops, fruit trees or household infrastructure	Medium	There is a large area for planting the rice or crops in the region of the sub-project.
27	Involuntary restriction of access by people to legally designated parks and protected areas	No	The area under the scope of the sub-project has no reservation zone or conservation park so it does not also limit the accessibility of the residents and works.
28	Impact on water for living and production during the time of constructing the work items (Other potential impact downstream due to water cut during rehabilitation)	High	Since Dai Thang reservoir provides water to irrigate 100 rice paddy field hectares of 2 seasons and 30 hectares for crops in villages of Dai Dong, Thang Loi, Dai Thang, , the agricultural irrigation may be affected when the reinforcement is conducted or water is cut. In addition, the Project Owner has made a plan to support 244 local households whom rice paddy field area of 571,297 m^2 is affected during construction. This cost is detailed in the RAP report
28.	Ethnic minority groups are living within the boundaries of, or nearby, the subproject.	Medium	In the Subproject area, Muong ethnic people make up for high percentage of 70%
29	Members of these ethnic minority groups in the area potentially could benefit or be harmed from the project.	Medium	The rehabilitation and improvement of Dai Thang reservoir complex will greatly affect the minority groups. These groups will be benefited from the works and also subject to the potential impacts in case of failure.
30	Other potential impact downstream due to water cut during rehabilitation	High	223 EM households will be influenced when the water cut off during the period of the water intake repairation; The area of 535,711 m^2 of the paddy rice will be encountered the water shortage within 2 to 6 months.
31.	Involve the construction of a large dam?	No	This is a small cluster that is why it is not related to construction of one large dam.
32	Depend on water supplied from an existing dam or weir or a dam under construction?	No	Water in Dai Thang reservoir does not depend on amount of water supplied from some dam or existing dam or under-constructing dam.

APPENDIX A5: DIAGRAM OF SAMPLING AND MONITORING ENVIRONMENT

Figure 5-1: Location where samples for environmental background assessment in sub-project area

Figure 5-2: Environmental monitoring position in the construction phase

Notes:

KK: Air

NM: Surface water,

NN: Underground water,

Đ: Earth.

Coordinates of sampling points are shown in the following table:

No.	**Symbol**	**Coordinates**		**No.**	**Symbol**	**Coordinates**	
		Latitude	**Longitude**			**Latitude**	**Longitude**
1	**KK01**	20°25’35,7”N	105°42’55,7”E	**14**	**NN03**	20°25’27,5”N	105°42’59,8”E
2	**KK02**	20°25’30,7”N	105°42’58,7”E	**15**	**NN04**	20°25’13,2”N	105°42’20,8”E
3	**KK03**	20°25’42,6”N	105°42’45,3”E	**16**	**NN05**	20°25’46,1”N	105°42’52,6”E
4	**KK04**	20°25’44,7”N	105°42’54,8”E	**17**	**NN06**	20°24’40,1	105°43’52,5”E
5	**NM01**	20°25’18,6”N	105°42’38,3”E	**18**	**Đ01**	21°06’19.4”	106°28’21.8”
6	**NM02**	20°25’34,9”N	105°42’47,8”E	**19**	**Đ02**	21°05’41.6”	106°29’11.3”
7	**NM03**	20°25’34,9”N	105°42’52”E	**20**	**Đ03**	21°05’17.0”	106°29’11.2”

8	**NM04**	20°25’39,3”N	105°42’47,1”E	21	Đ04	20°25’44,7”	105°42’54,8”
9	**NM05**	20°25’44,7”N	105°42’46,7”E				
10	**NM06**	20°25’32,8”N	105°42’57,4”E				
11	**NN01**	20°25’43,4”N	105°42’44,7”E				
12	**NN02**	20°25’32,4”N	105°42’58,4”E				

APPENDIX A6: ANALYSIS RESULTS OF ENVIRONMENTAL SAMPLES

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RESULTS OF ENVIRONMENTAL MONITORING

No: KQ. .

Type of sample : Ambient air
Number of samples : 4 samples
Sampling location : KK01: Air sample in main dam (X:574641,32; Y:2258850,51); KK02: Air sample in the way to main dam (X:574728,86; Y:2258698,76); KK03: Air sample in spillway area (X:574337,74; Y:2259062,54); KK04: Air sample in field area (X: 574612,45; Y:2259128,53);
Analytical requests : 09 parameters
Sampling date : Feb 05, 2015
Starting of Analysis sample : from Feb 06, 2015 to Feb13, 2015

No	Parameters	Units	Results				QCVN 05:2013/ BTNMT	QCVN 26:2010/ BTNMT
			KK01	KK02	KK03	KK04		
1	Temperature	^{0}C	16	15	15	15	-	-
2	Humidity	%	88,5	86	87,5	86,5	-	-
3	Wind speed	m/s	1,2	1,3	0,8	1,1	-	-
4	Noise	dBA	46	52	51	53	-	**70**
5	Pressure	mmHg	742	741	746	745	-	-
6	SO_2	mg/m^3	0,1	0,1	0,19	0,06	**0,35**	-
7	CO	mg/m^3	2,4	3	4,7	3,7	**30**	-
8	NO_2	mg/m^3	0,09	0,1	0,08	0,08	**0,2**	-
9	Suspended dust	mg/m^3	0,05	0,05	0,09	0,11	**0,3**	-

Note:
-QCVN 05: 2013/BTNMT: National technical regulation on ambient air quality;
- QCVN 26:2010/BTNMT: National standard for Noise;
- "-": No regulation.

Hanoi, February 16, 2015

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RESULTS OF ENVIRONMENTAL MONITORING

Type of sample : Surface water
Number of samples : 3 samples
Sampling location : NM01:Lake water in North side (X:574137,66; Y:2258322,13); NM02: Lake water in middle area (X:574412,88; Y:2258753,69); NM03: Lake water in the main dam (X:574534,24; Y:2258826,73).
Analytical requests : 15 parameters
Sampling date : Feb 05, 2015
Starting of Analysis sample : from Feb 06, 2015 to Feb 13, 2015

No	Parameters	Units	Analytical results			QCVN
			NM01	NM02	NM03	08:2008/ BTNMT (B1)
1	pH	-	7,87	7,14	7,72	**5,5 - 9**
2	DO	mg/l	5,75	5,58	4,76	**>= 4**
3	TSS	mg/l	41	44	47	**50**
4	BOD_5	mg/l	9	12	13	**15**
5	COD	mg/l	16,5	20	25	**30**
6	NO_3^-	mg/l	0,012	0,015	0,017	**10**
7	NO2-	mg/l	0,016	0,016	0,012	**0,04**
8	NH4+	mg/l	0,08	0,05	0,06	**0,5**
9	PO43-	mg/l	0,124	0,125	0,121	**0,3**
10	Zn	mg/l	0,22	0,18	0,22	**1,5**
11	Pb	mg/l	KPH	KPH	KPH	**0,05**
12	Hg	mg/l	KPH	KPH	KPH	**0,001**
13	As	mg/l	KPH	0,004	KPH	**0,05**
14	Total hydrocarbon	mg/l	0,02	0,01	0,01	**0,1**
15	Coliform	MP/ 100ml	3.800	3.500	2.500	**7.500**

Note:

-QCVN 08-2008/BTNMT: National technical regulation on surface water quality;

- "-": No regulation.

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RESULTS OF ENVIRONMENTAL MONITORING

No: KQ. .

Type of sample : Surface water
Number of samples : 15samples
Sampling location : NM04:Lake water in discharge side (X:574390,68; Y:2258960,58); NM05: Irrigation canal water in discharge side (X:574379,94; Y:2259126,86); NM06: irrigation canal water on the way to main dam (X:574690,86; Y:2258763,60).
Analytical requests : 15 parameters
Sampling date : Feb 05, 2015
Starting of Analysis sample : from Feb 06, 2015 to Feb 13, 2015

Analytical results:

No	Parameters	Units	Analytical results			QCVN
			NM04	NM05	NM06	08:2008/ BTNMT (B1)
1	pH	-	7,22	7,14	7,05	**5,5 - 9**
2	DO	mg/l	5,75	6,58	6,76	**>= 4**
3	TSS	mg/l	41	**55**	**54**	**50**
4	BOD_5	mg/l	9	12	13	**15**
5	COD	mg/l	12	22	18	**30**
6	NO_3^-	mg/l	0,015	0,015	0,021	**10**
7	NO2-	mg/l	0,013	0,016	0,018	**0,04**
8	NH4+	mg/l	0,12	0,13	0,12	**0,5**
9	PO43-	mg/l	0,12	0,13	0,11	**0,3**
10	Zn	mg/l	0,15	0,18	0,20	**1,5**
11	Pb	mg/l	KPH	KPH	KPH	**0,05**
12	Hg	mg/l	KPH	KPH	KPH	**0,001**
13	As	mg/l	KPH	KPH	KPH	**0,05**
14	Total hydrocarbon	mg/l	0,02	0,03	0,02	**0,1**
15	Coliform	MP/ 100ml	3.500	3.800	3.600	**7.500**

Note:

-QCVN 08-2008/BTNMT: National technical regulation on surface water quality;
- "-": No regulation.

Hanoi, February 16, 2015

TAS Department *RESEARCH CENTRE FOR ENVIRONMENTAL GEOLOGY*

Do Thi Hai, MA

RESEARCH CENTER FOR ENVIRONMENTAL GEOLOGY (RECENGE)
TESTING AND EVALUATING LABORATORY FOR ENVIRONMENTAL GEOLOGY
Address: Đông Ngạc, Từ Liêm, HN
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www.humg.edu.vn/vi

RESULTS OF ENVIRONMENTAL MONITORING

No: KQ.

Type of sample : Groundwater
Number of samples : 3 samples
Sampling location : NN01: Well water of Tran Duc Van household in discharge side (X: 574319; Y:2259087,22); NN02: Well water of Bui Thi Phuong household in the main dam (X:574718,14; Y:2258751,81); NN03:Well water of Bui Van Phuong household, Dai Dong hamlet (X:574759,77; Y:2258598,52).
Analytical requests : 16 parameters
Sampling date : Feb 05, 2015
Starting of Analysis sample : from Feb 06, 2015 to Feb 13, 2015

Analytical results:

No	Parameters	Units	Analytical results			QCVN 09:2008 /BTNMT
			NN01	NN02	NN03	
1	PH	-	7,15	7,25	7,35	**5,5-8,5**
2	Total dissolved solids	mg/l	703,1	540,7	631,8	**1500**
3	Rigidity	mg/l	325	216	322	**500**
4	DO	mg/l	3,2	4,2	3,8	**-**
5	(NH_4^+)	mg/l	0,05	0,05	0,03	**0,1**
6	Nitrate (NO_3^-)	mg/l	0,15	0,15	0,16	**15**
7	Nitrite (NO_2^-)	mg/l	<0,01	<0,01	<0,01	**1**
8	Cl^-	mg/l	71	62	68	**250**
9	Asen (As)	mg/l	**0,06**	**0,004**	**0,003**	**0,05**
10	Zinc (Zn)	mg/l	0,012	0,017	0,017	**3**
11	Lead (Pb)	mg/l	<0,0001	<0,0001	<0,0001	**0,01**
12	Iron (Fe)	mg/l	0,15	0,15	0,25	**5**
13	Hg	mg/l	0,0002	0,0004	KPH	**0,001**
14	Mangan (Mn)	mg/l	0,025	0,025	0,024	**0,5**
15	Coliform	MPN/100ml	8	5	6	**3**
16	Ecoli	MPN/100ml	1	3	2	**KPH**

Note:
-QCVN 09-2008/BTNMT: National technical regulation on underground water quality;
- "-": No regulation.

Hanoi, February 16, 2015

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RESULTS OF ENVIRONMENTAL MONITORING

No.: KQ. .

Type of sample : Groundwater
Number of samples : 3 samples
Sampling location : NN04: well water of Dang Van An, Thang Loi hamlet (X:573631,82; Y:2258155,04); NN05: Well water of kindergarten (X:576297,97; Y:2257332,10); NN06: Well water near An Binh Commune People's Commitee of (X: 576295,26; Y:2257149,04).
Analytical requests : 16 parameters
Sampling date : Feb 05, 2015
Starting of Analysis sample : from Feb 06, 2015 to Feb 13, 2015

Analytical results:

No	Parameters	Units	Analytical results			QCVN 09:2008 /BTNMT
			NN04	NN05	NN06	
1	PH	-	7,3	7,32	7,25	**5,5-8,5**
2	Total dissolved solids	mg/l	421	456	522	**1500**
3	Rigidity	mg/l	345	412	305	**500**
4	DO	mg/l	3,3	3,5	3,6	**-**
5	(NH_4^+)	mg/l	0,02	0,03	0,03	**0,1**
6	Nitrate (NO_3^-)	mg/l	0,15	0,15	0,15	**15**
7	Nitrite (NO_2^-)	mg/l	<0,01	<0,01	<0,01	**1**
8	Cl^-	mg/l	56	63	59	**250**
9	Asen (As)	mg/l	**0,03**	**0,05**	**0,04**	**0,05**
10	Zinc (Zn)	mg/l	0,015	0,015	0,012	**3**
11	Lead (Pb)	mg/l	<0,0001	<0,0001	<0,0001	**0,01**
12	Iron (Fe)	mg/l	0,12	0,22	0,13	**5**
13	Hg	mg/l	KPH	KPH	KPH	**0,001**
14	Mangan (Mn)	mg/l	0,015	0,005	0,005	**0,5**
15	Coliform	MPN/100ml	2	3	4	**3**
16	Ecoli	MPN/100ml	KPH	1	2	**KPH**

Note:

-QCVN 09-2008/BTNMT: National technical regulation on underground water quality;
"-": No regulation.

Hanoi, February 16, 2015

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Email:haidctv@yahoo.com
huonghumg@gmail.com

www.humg.edu.vn/vi

RESULTS OF ENVIRONMENTAL MONITORING

No.: KQ. .

Number of samples : 4 samples:
D01: Earth sample in main dam (X:574641,32; Y:2258850,51D02:Earth sample in the way to main dam(X:574728,86;Y:2258698,76);
D03:Earth sample in spillway area (X:574337,74; Y:2259062,54);
D04: Earth sample in field area (X:574612,45; Y:2259128,53)

Analytical requests : 9 parameters

Sampling date : Feb 05, 2015

Starting of Analysis sample : From Feb 06, 2015 to Feb 13, 2015

No	Parameters	Units	Name				QCVN 03:2008/BTNMT (mg/kg)
			Đ01	**Đ02**	**Đ03**	**Đ04**	
1	pH	-	7,2	7,4	7,0	7,1	-
3	Total dissolved salt	%	12	18	12	12	-
4	Al	mg/kg	1,8	3	2,2	2,4	-
5	N	%N	0,168	0,116	0,147	0,125	-
6	P	$\%P_2O_5$	0,125	0,164	0,145	0,132	-
7	Zn	mg/kg	4,48	5,24	4,23	5,67	**200**
8	As	mg/kg	8.5	8.0	4,5	8,6	**12**
9	Pb	mg/kg	3,6	6,5	2,7	4,5	**70**
10	Cd	mg/kg	<0,05	<0,05	<0,05	<0,05	**2**
11	Cu	mg/kg	3	5,6	5	4	**50**

Note:

-QCVN 03-2008/BTNMT: National technical regulation on the allowable limits of heavy metals in the soils;

- "-": No regulation.

TAS Department

Hanoi, February 16, 2015
RESEARCH CENTRE FOR ENVIRONMENTAL GEOLOGY

Do Thi Hai, MA

APPENDIX A7: PUBLIC CONSULTATION MINUTES

VIỆN THUỶ ĐIỆN VÀ NĂNG LƯỢNG TÁI TẠO

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh Phúc

Hoà Bình, *Ngày* 7 *tháng* 2 *năm* 2015

BIÊN BẢN HỌP

THAM VẤN CỘNG ĐỒNG

-Tên Dự án:

Dự án Sửa chữa và nâng cao an toàn đập (WB8)

-Tiểu dự án:

Sửa chữa và nâng cao an toàn hồ chứa nước Đại Thắng

I. Thời gian, địa điểm làm việc

- Thời gian:

Ngày 07 tháng 2 năm 2015

-Địa điểm:

Nhà mẫn non thôn Đức Bình

II. Thành phần làm việc:

1. Đại diện nhóm cán bộ cơ quan

Trương Mạnh Toàn: Đại diện chủ đầu tư

Phạm thị Ngọc Lan: Trưởng đoàn tư vấn môi trường xã hội

Nguyễn thị Mây thuỷ: Chuyên gia xã hội / Lê thanh Hà: Chuyên

Phạm thị Thuần: Cán bộ môi trường / gia tài chính ch

2. Đại diện địa phương

Nguyễn thanh Hải: trưởng thôn Đức Bình

Bùi Thanh Bình: Cán bộ địa chính

Đại diện người dân thôn Đức Bình

Bùi Xuân Dũng: Chủ tịch xã

III. Nội dung làm việc:

- Chủ đầu tư thông báo các hạng mục của tiểu dự án

- Bà Phạm Thị Ngọc Lan đề xuất các biện pháp cũng như... đảo xa các tác động trong việc thực hiện tiểu dự án

- Bà Nguyễn Thị Mây thuỷ trao đổi các vấn đề xã hội

Ông Lê Thanh Hà kết hợp cùng cán bộ địa chính xã, tư vấn thiết kế tác định loại khu vực đất bị ảnh hưởng, tác định các hộ gia đình bị ảnh hưởng

- Người dân, đại diện thôn trình bày ý kiến, nguyện vọng

IV. Ý kiến đóng góp của địa phương

- Ủng hộ việc thực hiện TDA
- Muốn bà con đất sẵn sàng trong việc hiến đất để thực hiện dự án cần có sự hỗ trợ đền bù hợp lý
- Yêu cầu giữ gìn vệ sinh môi trường

V. Kết luận

Đồng ý thực hiện TDA

Đại diện tư vấn môi trường xã hội

Phạm Thị Thuần

Đại diện địa phương

Nguyễn Thanh Hải

CHỦ TỊCH

Bùi Xuân Định

VIỆN THUỶ ĐIỆN VÀ NĂNG LƯỢNG TÁI TẠO

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh Phúc

Đại Đồng Ngày 6 tháng 2 năm 2015

BIÊN BẢN HỌP

THAM VẤN CỘNG ĐỒNG

-Tên Dự án:

Sửa chữa và nâng cao an toàn đập (WB8)

-Tiểu dự án:

Sửa chữa và nâng cao an toàn hồ chứa nước Đại thắng

I. Thời gian, địa điểm làm việc

- Thời gian:

Ngày 06/02/2015

-Địa điểm:

Nhà văn hoá thôn Đại Đồng

II. Thành phần làm việc:

1. Đại diện nhóm cán bộ cơ quan

- Phạm Thị Ngọc Lan Nhóm trưởng tư vấn MTXH
- Phạm Thị Thuần Chuyên gia MT
- Nguyễn Thị Hồng Thuý Chuyên gia xã hội học
- Nguyễn Đức Cường Cán bộ xã hội

2. Đại diện địa phương

- Bùi Xuân Dũng Chủ tịch xã
- Nguyễn Hoàng Bảy trưởng thôn
- Đại diện cho 25 hộ dân trong thôn
- Bùi Minh Phương Bí thư chi bộ

III. Nội dung làm việc:

Bà Phạm Thị Ngọc Lan thông báo các hạng mục công trình, các tác động MTXH có thể xảy ra trong trường hợp thi công TDA

- Nguyễn Thị Hồng Thuý làm việc trao đổi thông tin về các vấn đề xã hội
- Trao đổi, lấy ý kiến của người dân

- Điều tra số liệu diện tích người dân bị ảnh hưởng trong giai đoạn cắt nước phục vụ thi công

IV. Ý kiến đóng góp của địa phương

- Đồng ý với việc thực hiện TDA

- Đề nghị có chính sách hỗ trợ cho hộ có người DTTS để đảm bảo cuộc sống trong tháng cắt nước

- Yêu cầu chủ đầu tư thực hiện đầy đủ các biện pháp để bảo vệ môi trường

V. Kết luận

- Đồng ý thực hiện TDA

Đại diện tư vấn môi trường xã hội

Phạm Thị Thuần

Đại diện địa phương

(Trưởng phòn)

Nguyễn Hoàng Bảy

CHỦ TỊCH

Bùi Xuân Thắng

VIỆN THUỶ ĐIỆN VÀ NĂNG LƯỢNG TÁI TẠO
ĐƠN VỊ: TRUNG TÂM CÔNG TRÌNH THUỶ ĐIỆN

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh Phúc

DANH SÁCH
HỌP THAM VẤN CỘNG ĐỒNG

Dự án: ..... Sửa chữa và nâng cao an toàn đập (WB8) TDA Sửa chữa và nâng cao an toàn hồ chứa nước Đại Thắng

Nội dung họp: Tham vấn cộng đồng các vấn đề MTXH của TDA

Địa điểm họp: Nhà văn hóa thôn Đại Đồng

Thời gian: .....

Ngày 6 tháng 2 năm 2015

STT	Họ và tên	Địa chỉ thường trú	Số tiền	Ký nhận
1	Bùi Thị Thêm	Thôn Đại Đồng	30.000	Thêm
2	Bùi Thị Phiến	Thôn Đại Đồng	"	Phiến
3	Bùi Văn Diện	thôn Đại Đồng	"	Diện
4	Nguyễn Hoàng Bảy	đại đồng	"	
5	Bùi Minh Thường	Đại Đồng	"	
6	Bùi Hải Tám	Đại Đồng	"	Tám
7	Bùi Văn Bằng	"	"	Bằng
8	Bùi Văn Phượng	"	"	Phượng
9	Nguyễn Thị Thanh	Đại Đồng	"	Thanh
10	Đinh Thị Nhung	Đại Đồng	"	Nhung
11	Bùi Văn Sáu	" "	"	Sáu
12	Đinh Ngọc Tân	" "	"	Tân
13	Bùi Văn Chân	" "	"	Chân
14	Đinh Thị Diệu	" "	"	Diệu
15	Bùi Xuân Hải	Đại Đồng	"	Hải
16	Bùi Văn Toan	"	"	Toan
17	Bùi Văn Chiến	"	"	Chiến
18	Bùi Văn Sơn	" "	"	Sơn
19	Bùi Đức Tùng	" "	"	Tùng
20	Bùi Văn Tỉnh	"	"	Tỉnh
21	Bùi Công Sử		"	Sử

VIỆN THUỶ ĐIỆN VÀ NĂNG LƯỢNG TÁI TẠO

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh Phúc

Đức Bình, Ngày 27 tháng 3 năm 2015

BIÊN BẢN HỌP

THAM VẤN CỘNG ĐỒNG

-Tên Dự án:

Sửa chữa và nâng cao an toàn đập (WB5)

-Tiểu dự án:

Sửa chữa và nâng cao an toàn hồ chứa nước Đại Thắng

I. Thời gian, địa điểm làm việc

- Thời gian:

27/3/2015

-Địa điểm:

Nhà văn hoá thôn Đức Bình

II. Thành phần làm việc:

1. Đại diện nhóm cán bộ cơ quan

+ Trương Mai Toàn: Đại diện chủ đầu tư

+ Lê Thanh Hà: Chuyên gia tái định cư

+ Nguyễn Thị Hồng Thuỷ: Chuyên gia xã hội học

2. Đại diện địa phương

+ Đỗ Xuân Dũng: Chủ tịch xã

+ Nguyễn Thanh Hải: Trưởng thôn

+ Bùi Thanh Bình: Cán bộ địa chính xã

+ Vũ Văn Đoan: Cán bộ giáo thay thuỷ lợi và người dân.

III. Nội dung làm việc:

+ Ông Lê Thanh Hà công bố báo cáo RAP- Kế hoạch hành động tái định cư cho các hộ bị ảnh hưởng do mất đất

+ Đồng thời đưa ra các mức hỗ trợ đền bù

+ Xin ý kiến về sự đồng thuận của 12 hộ bị ảnh hưởng về đất

- Các bên liên quan và chính quyền địa phương đưa ra các phản hồi về báo cáo

IV. Ý kiến đóng góp của địa phương

- Các hộ bị mất đất tham gia cuộc họp đồng ý với những nội dung của chuyên gia tái định cư đưa ra
- Mong Chủ đầu tư thực hiện nghiêm túc để đảm bảo đời sống người dân

V. Kết luận

Đồng ý với các nội dung liên quan đến báo cáo RAP tái định cư

Đại diện tư vấn môi trường tái định cư

Phạm Thị Thuần

Đại diện địa phương

CHỦ TỊCH

Bùi Xuân Dũng

Appendix A8- IMAGES OF THE CURRENT STATE OF THE SUB-PROJECT AREAS

Appendix 8.1: Image of work items

Image 1: The pathway leading to the dam viewed from the top of the dam

Image 2: Pathway leading to the top of the dam

Image 3: surface of the earth dam

Image 4: Eroded left shoulder of the dam caused by rain

Image 5: The management house

Image 6: Management house

viewed from downstream

Image 7: Upstream dam

Image 8: Downstream dam

Image 9: Entry to the overflow

Image 10:Entry, threshold to the overflow

Image 11: Flood overflow

Image 12: Discharge through the overflow drain

Appendix 8.2: Images of community consultations

Image 1: In-depth interview of commune chairman

Image 2: Working with sectors and branches

Image 3: Consultation held at Dai Dong village

Image 4: Consultation held at Thang Loi village

Image 5: Consultation held at Duc Binh village

Image 6: Meeting with households of Duc Binh village

Image 7: Group discussions at Dai Thang village

Image 8: Consultation at Dai Thang village

Appendix 8.3: Sample selection and Field assessment

Taking sample of surface water

Taking sample of earth

Taking sample of underground water

Appendix 8.4: Pictures of areas affected by the sub-project

APPENDIX B: SOCIAL

APPENDIX B1: METHODOLOGY NOTE

1.1 Assessment methodology

There are various methods and techniques used in assessment; the Consultant has applied the following methods for information collection and assessment.

(i) Review and analysis of documents:

Before conducting field investigation, the consultant collected and studied documents available to understand guidelines and policies of the government as well as the sponsor on issues related to resettlement and ethnic minorities, and updated information about the localities in the subproject area. Necessary documents include legal framework and policies of the Government of Vietnam and WB on resettlement and ethnic minorities, aggregated the results from memoranda of project preparation organisations, feasibility report, local project proposals, documents on relevant invested projects; statistics on annual local socio-economic situation; socio-economic development report of the localities in the project area, relevant existing documents, documents available on customs, habits of local people.

The review and analysis of documents related to the project will provide background information about the project and help to explain why there are changes or why there are not. On the other hand, it also helps to identify gaps in data needed to be collected and assessed further. Sources of documents include Hoa Binh Provincial Project Management Unit (PPMU), Hoa Binh Province's Department of Agriculture and Rural Development, Lac Thuy Division of Agriculture, Hoa Binh Department of Natural Resources and Environment, Lac Thuy Division of Natural Resources and Environment, Hoa Binh Statistical Office, Lac Thuy District and An Binh Commune People's Committee.

(ii) Quantitative research, random sampling survey

Quantitative research, random sampling survey consists of the Provincial Project Management Unit, an important method in researches, impact assessment of the project to collect basic information on socio-economic situation at household level. Information from quantitative survey reflects the size, frequency, extent and tendency of phenomena/behaviours of objects the survey aims at. The quantitative survey was carried out by interviewing households using questionnaires.

Random sampling survey: to collect information from a large number of affected people by interviewing using questionnaires with specific questions, served for statistical analysis. The survey results will provide a basis for other researches and assessments as they allow collecting important data about implementation issues or specific indicators from a sample. This method requires a sampling strategy (shown below) to assess standards before and after the project.

(iii) *Qualitative research, in-depth interviews and group discussions:*

Use qualitative research with in-depth interviews, group discussions in the community consultation to find information which questionnaires (quantitative research) cannot cover up. Information gained from qualitative research is to answer questions, causes and explain phenomena and factors affecting in the project area. Besides, qualitative information can exploit deeper thoughts, feelings, attitudes and aspirations of information providers, particularly sensitive issues. Qualitative research uses group discussions and in-depth interviews to collect information. Households selected for this method are selected with similar characteristics in educational background, living standards, etc. Group discussions will be held with at least 5% of the households in the sample, about 6 - 8 people for a group

discussion.

In-depth interviews will be applied to who are members of affected households and staff involved in the project at hamlet and commune level.

In addition to qualitative information, in-depth interviews and group discussions also pay attention to community consultation, in order to learn more about views and attitudes of participants to the project development, especially women. A qualitative research is as follows:

Table B1-1: Qualitative research

No.	**Information collection method**	**Number of people interviewed**	**General information about participants**
1	In-depth interviews	1	Provincial project officers
2	In-depth interviews	3	Governmental officers at commune level (Chairman, staff in charge of culture, union)
3	In-depth interviews	2	Staff of Farmers Union and Women Union
4	In-depth interviews	6	Members of 6 households in the beneficiary area of the project
5	In-depth interviews	4	Members of affected households have different living standards
6	Group discussions (2 discussions)	16	Participants are members of affected households
7	**Total**	**32 people**	**There are 2 group discussions and 16 in-depth interviews**

(iv) Direct observation: this method helps to obtain timely and useful information supplementing data collected, helps to better understand the context in which information and data are collected and help explain survey results.

2.3 Research samples

Based on the basic design, the Consultant and officers of the Provincial Project Management Unit and commune cadastral officials make a list of households affected by each project in each hamlet. In the list of affected households provided by localities, the Consultant selects 100% of affected households and 20% of unaffected households in the project area (of which 100% of households are expected to be relocated) to interview by questionnaires. Samples selected ensure gender ratio, poor households and ethnic peoples.

In-depth interviews and group discussions were selected from survey samples and key information providers at provincial, district, commune levels and people. Each group discussion consists of 6-8 people.

Because the project area is located at 04 hamlets of 01 commune, it is quite favourable for the surveying. Therefore, the consulting group has carried out the survey as follows:

Table B1-2: Survey samples are allocated by region as follows

Households affected directly (production land loss) (Duc Binh 2 hamlet)		Households affected indirectly (Water loss in a construction season)		
Households	Rate	Thang Loi	Dai Thang	Dai Dong
12	100%	20 households	16 households	22 households

APPENDIX B2 - PUBLIC HEALTH INTERVENTION PLAN

1. The necessity of the construction of puplic health management plan

The activities of the subproject will generate impacts on the surroundings quality: air, water and soil environment, in addition it may arise disease. All these factors will affect directly 50 workers, the entire population around the project area and households along the transport route. The consequence of these effects lead to increase occupational accidents, traffic accidents, diseases related to respiratory and intestinal system and eyes.

There are 50 workers will directly contact with sources of pollution and disease from the activities of the project, although subproject have had measures to limit pollution such as dust, emissions, wastewater and epidemics, but there are potential impacts that we do not see immediately, so need to take measures for early detection of disease and sources of disease. The plan indicates the measures to minimize and prevent those impacts.

2. Objective

To control and prevent diseases, raise awareness of the people and the workers to protect health yourself; help people access fully medical services. Organize regularly medical examination to detect early disease due to impacts of the subproject; to build treatment plans for incidents related to diseases, occupational accidents and traffic.

3. Measure and content of public health management

- To train and raise awareness, prevent impacts on health
- Organize regularly medical examination for workers and people in the subproject region
- Build plan to minimize the impact on public health
- Build plan to prevent and treat diseases

4. Role and responsibility of agencies, organizations and individuals

Department of Agriculture and Rural Development (DARD)/ Project Management Unit (PMU):

- DARD and PMU are responsible for building materials about public health safety training.
- Coordinate all levels of authorities in An Binh commune,(local authorities, Fatherland Front, Women's Union, Farmers' Union, Youth Union, hamlet representative) organize propagandic activities about health safety.

Department of Health, Lac Thuy district Preventive Medicine Center

- To train and raise awareness for all basic levels, contractors and residents about prevention measures and treatments of diseases;
- Check the medical examination process;
- To direct promptly when epidemics appear, resolving incidents related to public health.

People's Committee, Social Organizations

- To direct, guide and organize the health safety work; to coordinate closely with contractor, Department of Health and Preventive Medicine Center when epidemics appear.

Health Station: To prepare the medical examination plan and guide water pollution treatment, epidemic prevention and treatment.

5. Implementation Schedule

Public Health Management Plan implemented at 3 stages of the subproject and extended 6 months at operation stage.

Table B2-1 Implementation Schedule of "Public Health Management Plan"

No	Measure	Content	Responsible unit	Cost	Time
1	To train and raise awareness, prevent impacts on health	-Identify the impact of air and water environment, food safety. -Preventable measures (using a comforter when entering the affected area, treat water pollution by alum and chloramine B) -Cleaning household sector, ranch house	-Department of Agriculture and Rural Development (DARD) -Project Management Unit (PMU) -Lac Thuy district Preventive Medicine Center -Health Station at commune/ ward - Contractor	15.000.000 millions	2 stages in the early and the mid-stage of the project
2	-Organize regularly medical examination for workers and people in the subproject region	- Check the health of workers 3 months/ time, residents in the affected areas 6 months / time - The diseases related to respiratory system, intestinal tract, eyes - To consult the affected people during examination - Advise or handle when the detection of abnormalities related to the impact of subproject (timely	-Department of Agriculture and Rural Development (DARD) -Project Management Unit (PMU) -Lac Thuy district Preventive Medicine Center - Health Station at commune/ ward - Contractor	Budget of Lac Thuy district	3 months/ time from the start of construction to 6th month

No	Measure	Content	Responsible unit	Cost	Time
		notify to the authorities and functional units)			
3	- Build plan to minimize the impact on public health	- Medical staffs at commune/ ward monitor regularly the implementation of the mitigation measures of construction units. - To treat timely occupational accidents and traffic - To vaccinate completely children, pregnant woman	-Department of Agriculture and Rural Development -Project Management Unit (PMU) -Lac Thuy district Preventive Medicine Center - Health Station at commune/ ward - Contractor -Women's Union -Fatherland Front	Budget of Lac Thuy district and contractor	Continuously during the construction time
4	Build plan to prevent and treat epidemic	- To spray fly and mosquito- spray in the project area with the frequency of 3 months/ time. - To guide the water sanitation; use chloramine B for pretreatment of wastewater on work site and households. - When appearing epidemic, we need localize epidemic, isolate infectious objects and spray chloramine B to disinfect.	- Department of Agriculture and Rural Development (DARD) - Project Management Unit (PMU) - Lac Thuy district Preventive Medicine Center - Health Station at commune/ ward - Contractor - Women's Union - Fatherland Front	Budget of Hoa Binh province (Department of Health) and contractor	Continuously during the construction time (18 months)

APPENDIX B3 - PUBLIC CONSULTATION, PARTICIPATION AND COMMUNICATION STRATEGY

1. The necessity of the construction of communication plan

The subproject "Rehabilitation and safety improvement of Dai Thang reservoir" cause impacts: (i) positive impacts: Dai Thang Reservoir supplies irrigative water for 100 ha of paddy rice, 30 ha of farm produce as well as depletes groundwater for 200 households surrounding; (ii) negative impacts: acquire land and assets on land of 12 households, affect economy and public health, impact on gender equality…

The communication and public consultation plan is done throughout from the establishment of the investment project to the project operation. This helps local communities and managers to understand and visualize the entire impacts (positive, negative) to provide mitigation measures the impact on the natural environment and society, especially vulnerable objects include children, the elderly, women and sensitive ecosystem.

Information from communication and public consultation plan help managers, local authorities, monitoring unit to give decisions quickly or change timely decisions or plans during the project implementation.

2. Objective

To publish information about sub-project and provide all materials on the action plan to government at various levels, social organizations, unions and resident in sub-project areas. To consult local communities and organizations for the plan will be made for each stage of the project. The feedback helps the investors and the management level to improve plans to meet practical needs prior to the implementation of the action plan.

3. Contents

- Information on the subproject and policies of interest will be disseminated to people by Project Management Unit (PMU);
- Environmental and Social Management Plan: (i) the PMU and consultancy units provide information of impacts and mitigation measures; (ii) To consult the local authorities and social organizations, unions, people around the project area.
- Resettlement Action Plan: Provides information about land acquisition, resettlement, compensation cost apply framework and support policies of the subproject and the provisions of Hoa Binh Province and government at various levels, affected people
- Gender Action Plan: provides information about gender equality for the local authorities and social organizations, unions, people around the project area.
- Public Health Management Plan: provides information on the solutions, disease prevention plan, medical examination periodically.

- Social security, traffic safety, social evils: provide information about law, legal education for workers, people around the subproject area.
- Dam Safety: disseminate plans when occurring dam safety incidents in the construction process and the rainy season.
- Operate mining and flood discharge: provide information and detailed plans for the flood discharge to people around the project area and downstream area; make protection plan for the people, the buildings in downstream of the dam.

4. Forms of communication, community consultation

In order to organize the effective communication activities, need understand the basic elements of the communication process and public relations of them.

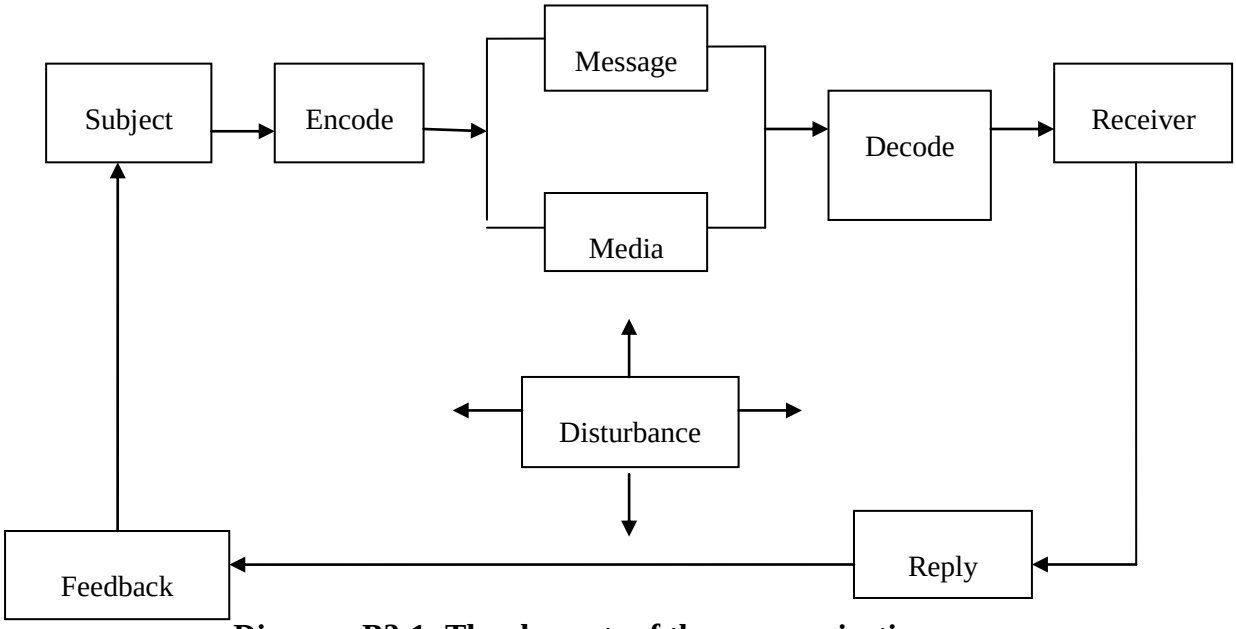

Diagram B3-1: The elements of the communication process

- Organize meetings to disseminate information for local authorities, social organizations, unions, people of the subproject region (An Binh commune);
- Through the mass media, basis loudspeakers, commune and village boards.
- Issue brochures, consultative questionnaires to local authorities, unions, people of the subproject area;
- Through the activities of organizations and clubs;
- Training;
- Other media and information forms.

5. Role and responsibility of agencies, organizations and individuals

Department of Agriculture and Rural Development represents Hoa Binh province people's committee is an investor, and Project Management Unit for investment and construction in Agriculture and Rural development of Hoa Binh province is the project implementation unit.

Department of Agriculture and Rural Development (DARD)/ Project Management Unit (PMU):

- DARD and PMU are responsible for building materials about communication plan and participatory public consultation.
- Coordinate government at various levels in An Binh commune, (local authorities, Fatherland Front, Women's Union, Farmers' Union, Youth Union, hamlet representative) organize propaganda activities for this plan.

People's Committee, Social Organizations

- To direct, guide and organize the propaganda activities and disseminate contents of communication, participatory public consultation.
- Direct news agencies, local propaganda agencies to spend the appropriate time for disseminating plans and the impact of the subproject.

Land Clearance Committee

- Provide information about land acquisition, resettlement, compensation cost apply framework and support policies of the subproject and the provisions of Hoa Binh Province and government at various levels, the affected people.

Health Station: disseminate information on the disease prevention plan, medical examination periodically, solutions when having epidemic.

6. Implementation Schedule

The communication plan and participatory public consultation implemented under stages of the subproject; to provide completely information for local people and government at various levels.

Table B3-1 Implementation Schedule of "Communication Plan, Consultation with Community Participation"

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
1	**Preparation**	Disseminate information, consult the authorities about subproject: scale, type of investment, the main works, incidence, benefits of the subproject.	Organize meeting at government at various levels, mass organizations.	DARD and PMU	Hoa Binh Province People's Committee, Department of Planning and Investment, Department of Finance, Department of Natural Resources	

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
					and Environment, Lac Thuy district People's Committee, Government of An Binh commune	
		Disseminate information about policies, compensation plan, the draft of resettlement action plan.	Meetings, leaflets, consultation votes at all government levels, the affected households around the subproject area.	PMU coordinate with design consultancy unit, resettlement action plan consultancy unit.	Lac Thuy district People's Committee, An Binh commune, Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct, 70 households in the project area.	Perform 2 times: to prepare and present a draft of resettlement action plan
		Disseminate information about project, present the draft of ESIA and ESMP reports, gender plan, public health, communication, etc.	Meetings, leaflets, consultation votes at all government levels, the affected households around the subproject area	PMU coordinate with design consultancy unit, ESIA consultancy unit	Lac Thuy district People's Committee, An Binh commune, Dong Son Precinct, Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune, 70 households	Perform 2 times: to prepare and present a draft of resettlement action plan.

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
					in the project area.	
		Compensation and resettlement	Organize meetings to disseminate information about measure, counting, compensation plan, post information in noticeboard of commune/ precinct and village/ urban groups.	PMU coordinate with Compensation, Assistance and Resettlement Board	An Binh commune People's Committee Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct and 12 affected households.	Implement according to Resettlement Action Plan report.
No	**Stage**	**Content**	**Form**	**Responsible unit**	**Receptive unit**	**Note**
2	**Construction and Operation**	Gender Action Plan	Meetings, leaflets, basic broadcasting, consultation votes at government at various levels, the affected households around the subproject area	PMU and Social Supervising Consultant	An Binh commune People's Committee Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct and 70 affected households.	Implement in 3 phases of the subproject.
		Public Health Management Plan				
		Social Management Plan				
		Environmental Management Plan		PMU and Environmental Supervising Consultant	DONRE, An Binh commune People's Committee, Women's Union, Fatherland Front, Farmers'	Implement in 3 phases of the subproject

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
					Union, Health Station, Cadastral Division of commune/ precinct and 70 affected households.	
		Public order and social evils		PMU and contractor	An Binh commune People's Committee , Women's Union, Fatherland Front, Farmers' Union, Health Station, Cadastral Division and Police of commune/ precinct .	
		Traffic Safety and Fire Prevention and Extinction				Construction Stage.

Monitoring Assessment: PMU make a monitoring report of communication plan and participatory public consultation to control communication content, synthesize feedback from the Monitoring Consultant Unit, local government, social organizations, unions and citizens to supplement or amend policies and measures of the management plan to suit each stage of the subproject.

Implementation Cost

The implementation cost of this plan is integrated with other plans (communication content and methods will be acquired and build by other plans. Social Management Plan chairs other plans related to social issue. Cost of this phase focuses primarily for broadcasting and organizations, the expected cost is 50,000 million (fifty million VND) in 8 mont

APPENDIX B4: GENDER ACTION PLAN

1. Necessity to combine a gender integration plan into Dai Thang reservoir, at An Binh commune, Lac Thuy district, Hoa Binh Province

Gender integration into a socio-economic development plan is a relatively new concept in our country. Similar to gender integration into the policy, the nature of gender integration into does not mean that there are separate plans for men and women, even no plans given to women only. Instead, gender integration into the plan means considering influence, impact of each plan (national, agency, local, grass-root level, etc) for demand and development of women.

Law on Gender Equality, which has been effective since 01 July 2007, has created favourable conditions for success of the National Strategy for "the Advancement of Vietnamese Women". Therefore, it's necessary to combine gender integration into socio-economic development planning of the country in general and the plan for repairing, upgrading the reservoir in particular. This must bring about practical effects, promote equality in social development or creates the same opportunities for everyone, men as well women in order that they may develop harmoniously, in right direction and for proper purpose.

Gender integration is here to meet demand for labour, employment, opportunities for men and women to access and enjoy the state's policies, in which the priority choice is to provide both men and women with the same opportunity to stable employment and income with labour structure appropriate, beneficiary to both men and women.

2. Bases to build a gender integration plan

- Draft on socio-economic development comprehensive planning of Hoa Binh province in 2011 - 2020 period;
- 5 year socio-economic development plan of Hoa Binh province in 2011 - 2015 period;
- Current status of gender in households entitled to profit from Dai Thang reservoir project, Hoa Binh province from direct survey, investigation of the project's engineering group in March, 2015.

3. Method to build a gender integration plan

- Gender integration activities are developed based on activities of the project for repairing, upgrading Dai Thang reservoir at An Binh commune, Lac Thuy district, Hoa Binh province managed by the Ministry of Agriculture and Rural Development (MARD). This is an integration plan not a separate plan.

- Build objectives for the gender integration plan in Dai Thang reservoir project of the province.

- Write the gender integration plan and get approval from the project management unit (PMU).

- Consult with relevant partners: Private and state sector.

- Modify and finish the plan.

4. Current status of gender issue in Dai Thang reservoir project at An Binh commune, Lac Thuy district, Hoa Binh province

Shortcomings of analysing current status of the reservoir project:

- Lack of initial basal information.
- Lack of gender based statistic data and database

This part will be supplemented when analysing gender in Dai Thang reservoir project at An Binh commune, Lac Thuy district, Hoa Binh province.

Dai Thang reservoir project at An Binh commune, Lac Thuy district, Hoa Binh province is significant to meet social demand, strengthen economic development of rural areas according to policies of the Party and the State. The project will have significant influence on social resources such as increasing agricultural output, creating jobs as well as reducing poor households, in which women make an important contribution to this development.

With the objective is to eliminate gender discrimination, to provide equal opportunities for women and men in socio-economic development and human resources development, to forward to actual gender equality between men and women and to establish, enhance cooperation, support between men and women in all aspects of social life and families, XIth National Assembly, Law No. 73/2006/QH11 has promulgated Law on gender equality. Gender equality in fields:

- Gender equality in politics
- Gender equality in economics, labour
- Gender equality in education and training
- Gender equality in health care
- Gender equality in families

Conduct survey of work assigned in enjoyable families. Statistic results are given in table 2:

Employment issues are the first information which demonstrates the position and role of women in the family and in the society. In 4 villages affected by the project, there are not many women taking over the position as village leader, president, secretary and important positions in the community; 100% is male except women union. Female employment work in the field, and male employment usually has work with higher salary than female. Female often takes part in hiring and farming, and male takes part in agriculture-forestry-aquaculture and construction industry. Over 71.43 % is the percentage for women doing housework. Thereby, this shows a picture of women usually having low income. When being interviewed, almost all women suppose that their husbands make decision to invest in production and important work and women mainly raise children and do housekeeping.

Table B4-1: Work assignment in households of the project area

(Source: Survey data)

Production activities	**Both genders (%)**	**Male (%)**	**Female (%)**
Cultivation (rice, other crops)	85.72	8.57	5,71
Husbandry	92.85	5.71	1.44
Afforest ration/forest care/forest protection	57.14	35.71	7.15
Exploitation of forest products	50	35.71	14.29
Fishing and aquaculture	57.14	14.28	28.57
Worker/employee	42.86	50	7.14
Business/trade	35.71	21,43	42.86

Production activities	**Both genders (%)**	**Male (%)**	**Female (%)**
Work away from home (not often at home)	21.43	71.43	7.14
Family activity			
Child care	64.29	7.14	28.57
Housekeeping	28.57	0	71.43
Cooking/housewife	22.86	0	77.14
Taking part in community work	**Both genders (%)**	**Male (%)**	**Female (%)**
Join in community meetings	85.71	10	4.29
Join in production training	71.42	14.29	14.29
Social and political organization activities	78.57	21.43	0
Decision making			
Making decision on family expenses (shopping on valuable asset, wedding)	92.86	7.14	0
Making decision on children's study and career	57.14	35.71	7.15
Decision on investment and production	71.43	22.86	5.71

(Source: Investigated data)

From results of Table 4-20

- For production activities: cultivation (rice, crops planting); husbandry, afforestry/forest care; exploitation of forest products, worker/employee and aquaculture, both 2 genders male and female take up a dominant part. The activity which makes more than 85% is cultivation and husbandry.. Work away from home activity mainly concentrates on male (over 71.43%)

- For family activities: women do most of the work as children care, housekeeping, house works. The housekeeping, cooking/house works take over 71.43%, the household from beneficial region takes 64.29% in sharing the work of child care. This is a time-consuming work for women.

- Taking part in community activities: both genders mainly take part in this activity, concretely, join in community meeting (85.71%); join in production training (71.42%); social-political organization activities (78.57%).

- Taking part in decision making: most of the households agree that both gender make decision. Decisions on large family expenses (valuable properties purchase, wedding) take 92.86%; decisions on study and career of children take (57.14%) and decisions on investment and production take 71.43%.

In general, this is due to cultural features and traditional properties of Viet Nam; for instance women often produce small business and work in agricultural sector such as processing; and other industries such as exploitation is undertaken by male; the other reason

is due to the limited awareness of gender equality. In addition to participating in family income, women also have to take care of the family; hence they lack of time of taking rest, leisure and taking part in social activities, as well as the opportunity to take part in training and upgrading the ability. This restricts the ability to access to advanced technology and to contribute to development goals. Hence, without timing and reasonable support the chance for development of women is lower than men. To sustain in this competition, it is required both female and male to improve their knowledge, skills, and determination. If an individual or a certain gender starts at a lower position, and has less time and opportunity to invest to study the risk of failure for them or for that gender would be higher. Therefore in order to improve the contribution of women, chances for access and getting benefit from activities of dam safety and rehabilitation program must be uniform for both 2 genders. In these activities, it should be performed in the most favourable way for women's participation

It can be said that both sexes highly appreciate the role of water resources and wish to have enough water to reduce working time. This data represents the contribution of female and male in production and employment; this indicates the degree of equality and responsibility of each gender in the project area.

Gender integration into the project for repairing, upgrading the reservoir's dam of Hoa Binh province is necessary to increase women's contribution to building the country. Gender integration will be an issue of concern in the whole process of implementing the project to ensure an opportunity for women to participate and benefit from gender equality to men in all activities when implementing plans of the project.

5. Objective - Output and strategy for implementing gender integration plan

5.1 Objective

Equality between men and women in access, participation and benefiting from support activities between men and women in planning, implementing the program for rehabilitating, upgrading the reservoir's safety of Hoa Binh province.

5.2. Output

- Competence for women in activities of the project, production households, preference group are improved similar to men in access and participation into activities, programs and services that promote benefits of the project.
- Build output results guaranteed with participation of both genders.
- Clearly define the number or percentage of benefited person to be men or women. Output results reflect positive changes of each gender after participation in the project.
- Minimise negative impacts of the project on women.
- Point out potential issues and remedies to minimise negative impacts, to encourage women to participate, maximize benefit of the project for them.
- Propose planning and implement tasks to access and solve gender issue in the project.
- Propose method of access and interference to promote benefit of the project for women and their participation in the project.
- There are woman representatives and women's participation in organisations.

5.3 Solution groups to attain the objective

5.3.1 Heighten women's competence

- Define and heighten competence for agencies/partners related to the project area and women labour in order that these objects support and enhance competence of women in the project area.

- Evaluate the demand for training women
- Organize training based on women's conditions to enable them to easily attend. (require a certain percentage of women participating in training)

5.3.2 Improving women's access and use of information

Evaluate demand and appropriate information channel for women in the project area and hired labour to build an information system for these objects

Support application of information for women

5.3.3 Favourable policy and support for women

- Hold dialogues with the project owner on policies appropriate for women in the project area (priorities for women in use of land, access to capital, training, etc)

6. Implementation organisation

6.1 Gender specific priority activities:

Priority activities include:

- Recruit gender cadres (propagandize, canvass residential group to move from the project area to hasten construction progress in order to minimise impacts on people's health, safety).
- Train in gender issue in the project area for the PMU and action cadres group to help them to have awareness and capability of necessity for gender integration in building plans
- Train in gender issue for cadres of districts, communes in the project area
- Train PMU, action cadres group and group in charge of gender analysis in gender analysis.
- Implement gender analysis in the project on the dam's safety, which is a very important activity to define advantages, difficulties of women as a basis to build appropriate gender integration activities.

6.2 Supervision for plan implementation

- Coordinators of each component, gender cadres and PMU take interest in gender integration when implementing (based on indexes and criteria).
- Cadres supervise, evaluate, monitor implementation of gender integration plan (in coordination with gender cadres, coordinators), report, and evaluate supervision with consideration of gender criteria.
- Present result of gender integration implementation in periodic reports.
- Recheck annual action plans and adjust accordingly.

Gender specific activities in next years will be defined and planned based on results of gender analysis and rechecking this plan annually.

The above gender analyses show that a gender action plan is very necessary to facilitate women's maximum participation in the construction phase of the project, to provide new opportunities for women to raise income without increasing their life burden and to contribute to enhancing role and position of women in the project area. The objectives of this plan are as follows:

(i) Local contractors will employ at least 30% women labour in maintaining, construction and repair;
(ii) For a similar type of work, women labour must be paid equal to men labour;
(iii)Safety conditions must be the same for both men and women;

(iv) Local contractors aren't allowed to employ chill labour;
(v) Encourage utilization of local labour and avoid establishment of site huts;
(vi) Women group and Women Union will be consulted in design of the sub-project;
(vii) Train gender integration for national, provincial and local agencies (or PMUs and other relevant parties).
(viii) Train and build competence for women participating in making decisions of the community and sub-projects in the most significant way (or training in participation and negotiation skills, marketing skills and train in mathematics and literacy;
(ix) Ensure women's participation in tours for study of the project
(x) Agricultural expansion encouragement services aimed at women are designed and handed over to women.
(xi) Strategy for enhancing awareness of HIV/AIDS will be introduced prior to commencement of civil works. PMU will be responsible for monitoring and reporting indexes of implementing the gender action plan including women's participation, target work and training and campaigns to prevent HIV pandemic.
(xii) At least one woman will represent the commune in the commune supervision board (making up 1/3 total members.

Table B4-2: Gender action plan of the project

Results of the project	Work and indexes	Responsibility	Time:
Result 1: Increasing the dam's safety, improving irrigation conditions	Contractors must preferably employ unskilled labour (through sub-contracts); at least 30% total labour is local unskilled labour; Among 30% local labour, give priority to to unskilled women labour; women labour and men labour will be equally paid for the same type of work; Contractors aren't allowed to employ child labour; The people who want to work for the project will register their name in the list of village/hamlet. Village leaders and commune cadres will provide this list to the	PMU/the project coordination consultant will be responsible for ensuring that these provisions will be written in contracts; commune cadres will provide the contractor with the list of people who want to work for the project; Commune cadres are responsible for guaranteeing to meet the proposed objective. Commune Women Union is also responsible for ensuring that women of the commune are employed by the project.	During construction period

Results of the project	Work and indexes	Responsibility	Time:
	contractor, the contractor will select based on giving priority to poor households, vulnerable households		
Result 2: Strengthen competence of the people to exploit advantages of the sub project	At least 30% women participate in agricultural expansion encouragement classes	Provincial level project management board cadres, District level cadres, Communal level cadres,	During construction period
Result 3: **Raise awareness of potential social evils for the vulnerable people, especially women and ethnic minority people**	Program for prevention of HIV/AIDS and slave trade. Program for community based risk mitigation Information about risk mitigation will be delivered to communes, villages affected by the project by using an approach with main participation of poor households and vulnerable households (for example: ethnic minority people, households with women as a householder, households with old people, handicapped people) Data, information must be appropriate in languages, culture and gender, especially they must be translated in ethnic minority	The provincial level and communal level Women Union are responsible for organizing and implementing the program (training and preparing documents) in co-ordination with commune, district health centers. Village/hamlet women union is responsible for propagandizing, popularizing information. Commune, district health centers will support commune women unions. The project coordination consultant will provide domestic and international gender experts and ethnic minority experts. Gender experts and ethnic minority experts will check existing documents and supplement (if necessary) for the program	monthly before and during construction of the project

Results of the project	Work and indexes	Responsibility	Time:
	languages depending on each region; Women Union, representatives of the center for HIV/AIDS prevention and the communes will train propagandists for each commune/village in the project area. The programs will be implemented at communes/village by two propagandists (village leader and 1 member of Women Union). The program will be implemented at villages and market days through distribution of documents on the project, documents on the program and on loudspeakers		
	The program for minimizing risk during construction: PMU and the contractor will closely coordinate with commune, district health services to deploy programs to raise awareness, train, prevent, diagnose and treat diseases for workers. All the programs and documents are developed with gender integration including vulnerability and demand of both men	PMU Contractor Local health center Communal level cadres, Women Union will implement general coordination to create a bigger total strength in HIV prevention	During construction period

Results of the project	Work and indexes	Responsibility	Time:
	and women. The contractor will: Deploy programs to raise awareness for workers and communities including providing information, educating, propagandizing HIV infection and guiding prevention measures. Provide free advice and encourage workers to test for HIV in order to ensure that all of them know their health state. Support access to health service and encourage HIV infected people to admit their HIV infection state; Provide medical devices (provide condoms free of charge) to workers at site huts;		
Project management	- Instructions about Gender and development and training will be provided to employees of the PMU, local organisations and contractors. All activities and development of competence will include objectives for women's participation and EM. Consult for implementation of the	- Consult for implementation of the project - PPMU	During design and initial implementation

Results of the project	Work and indexes	Responsibility	Time:
	project PPMU in design and initial implementation		
Project Results	Activities and indicators	- Responsibilities	Time
	PPMU in design and first implementation	-	

Table B4 - 3: Trainings with support on gender integration during the implementation of the Dai Thang Reservoir/Dam Rehabilitation and Improvement Sub-Project

No.	Training contents	Required proportions of women	Estimated budget
1	Capacity building on social and environmental management of the sub-project, with community involvement	At least 50%	5 mil/1 course x 2 courses
2	Awareness raising on dam safety	At least 40%	5 mil/1 course x 2 courses
3	Technical training on ICM (Agricultural promotion course)	At least 50%	20 mil/1 course x 2 courses
4	Awareness raising on infectious disease prevention and control	At least 50%	5 mil/1 course
5	Awareness raising on maternal and child health	100%	5 mil/1 course
6	Training and raising awareness of women about integrating gender action plan in sub-project.	50%	5 mil/1 course
Total			55 mil

APPENDIX B5 – GRIEVANCE REDRESS MECHANISM

Any complaint related to any aspect of the project will be handled through negotiation to obtain a consensus. A complaint will undergo 3 phases prior to being put to a legal court as the last resort. CPO will incur all administrative and legal expenses arisen by complaints handling and complaints.

1. Initial phase, commune People's Committee

An affected household who is dissatisfied will present their complaint to any member of the commune People's Committee through the village head or directly to the CPC, written or verbal. The above member of the CPC or the village head shall inform the CPC about the complaint. The CPC will work individually with the affected household who has a complaint and will have 30-45 days to handle after receiving the complaint. The secretariat of the CPC is responsible for documenting and archiving all the complaints that it handles.

When the CPC promulgates a decision, the household may appeal within 30 days. If the household is still not satisfied with the secondly issued decision, they may appeal to the DPC.

2. Second phase, the District People's Committee

When receiving a complaint from a household, the DPC will have 30-45 days to handle as of receiving such complaint. CARB is responsible for documenting and archiving all the complaints it handles.

When the DPC issues a decision, the household may appeal within 30 days. If the household is still not satisfied with the secondly issued decision, they may appeal to the Province People's Committee.

3. Third phase, the People People's Committee

When receiving a complaint from a household, the PPC will have 30-45 days to handle as of receiving such complaint. The PPC is responsible for documenting and archiving all the complaints it handles.

When the DPC issues a decision, the household may appeal within 30 days. If the household is still not satisfied with the secondly issued decision, they may appeal to a court within 45 days. The PPC has to pay compensation into an escrow account.

4. Final phase, civil court

If a complainant files their case to a court and the court decides to side with the complainant, then the province's government must satisfy compensation to a level decided by the court. In case the court takes side with the PPC, the complainant will take back payment paid to the court.

To ensure the above complaint handling mechanism be practical and acceptable to PAPs, consultation with local government and community has taken into account distinctive cultural characteristics as well as traditional cultural mechanisms in raising and handling complaints and conflicts. Objects and efforts of ethnic minorities have also been defined and culturally acceptable methods have been determined to find an acceptable solution.

Complaint handling process for an affected person has been described in Information about the sub-project for "Repairing and upgrading safety Dai Thang reservoir's dam" and has been issued to the affected person. To avoid the case that an affected person do not who to meet at the communal, district or provincial level to handle their complaint, the document has

provided name, address and telephone number of the persons in charge of handling complaints in order to help the affected person to effectively complain.

The affected persons will be exempted from all expenses related to administrative and legal procedures. Complaints submitted to a court are also exempted from filing expenses. All the complaint profiles and handling methods will be kept at the People's Committee of communes, communal level public consultation board and investors in works of the sub-project for "Repairing and upgrading Dai Thang reservoir's dam".

APPENDIX B6: INFORMATION DISCLOSURE, ACCOUNTABILITY AND MONITORING

1. Consultation and announcement

The main objectives of information announcement and public consultation is to ensure the participation of affected communities, households, local governments and organizations concerned in sharing the Project information, consulting the selection of technical plans, planning impacts on land, income and assets on land... The announcement is an important contribution in accerlerating the Project progress during implementation and preparation, as well as when the project is put into operation with the consensus of the community, government, and PMU. This will minimize the possibility of conflicts and other risks and increase the investment efficiency and social significance of the Project.

The public consultation and announcement should ensure:

- The local authorities as well as the representatives of the people affected shall be involved in the project planning and decision making process. The PMU shall work closely with the commune/district during the implementation of the Project. The involvement of the people affected in the implementation process shall be remained by asking the commune/district to invite the representatives of the affected people to be a part of the Council on Compensation and Resettlement as well as in resettlement activities.
- All information about the items and activities planned for the Project should be shared to the people affected.
- The demands and priorities of the affected people, as well as their responses to the proposed policies and activities, should be collected.
- The affected people should be fully informed of the decisions influencing directly their income and lives, and can be involved in activities and making decisions on issues directly affecting them.
- The transparency in all activities relating to land acquisition, compensation, resettlement and rehabilitation should be ensured.

For the World Bank, those people affected by the project should be fully informed and consulted on resettlement and compensation plans. Consultation is the starting point for all activities related to resettlement. The people affected by resettlement may be afraid that their livelihoods and community relations can be affected, or their rights can not be guaranteed. Being involved in resettlement planning and management helps to alleviate these fears and bring the affected people the opportunity to participate in decisions that affect their lives. The implementation of resettlement without consultation may lead to an inappropriate strategy and ultimate ineffectiveness. Without consultation, the affected people may have negative reactions to the project, causing social problems, significant delay or even cancellation in completion of goals, thereby increasing the costs. As a result, with consultation, the initial resistance can be translated into the constructive participation.

For Vietnam, a further key step in strengthening democracy at grass-roots level is the Directive No.30-CT/TW of the Central Committee of the Communist Party of Vietnam in "Building and implementing regulations on grassroots democracy" and the Decree No.79/2003/ND-CP also on this issue. The key point of this legislation is the famous slogan, which is "People know, people discuss, people do and people inspect." The Ordinance No.34/2007/PL-UBTVQH11 has addressed the matters that should be consulted by local

governments and communities before decision-making by the authorities, including building compensation and resettlement plans relating to the project and works in the commune/ward. The Clause 2 in Article 39 of the Law on Land 2003 requires the announcement of resettlement issues such as reasons, land acquisition plans, relocation plans, overall compensation plans, and land clearance to the people affected.

Thus, consultation and participation is an innovation in the implementation of projects in Vietnam. This policy will address the shortcomings in the implementation of the projects, as both the locals and the person in charge of project implementation are inexperienced in this field.

The following points should be noted to encourage the participation of stakeholders in the consultation process of the project:

- Identify and attract all stakeholders, especially people living in the project area and those affected (men, women, the poor, ethnic minorities...), in the process of consultation and participation;
- Develop participatory strategies for Project planning, implementation, monitoring and evaluation.
- Develop the topics and content needed for promotion and popularization campaigns, as well as negotiation procedures for the affected people on their benefits.
- Attract stakeholders in decision making at all stages of the project (e.g. design plans, compensation methods, implementation schedule, etc...).
- Establish a schedule for completion of activities such as campaigns to provide information, the extents and forms of compensation, benefits, location and relocation plan.
- Develop procedures for complaint settlement.

The public consultation should be regularly carried out for the units in charge of preparation and detailed design of the project categories. This helps to ensure the participation of communities in the proposed designs and limit the adverse impacts on the community. This also helps works to be friendlier with the community and users.

The consultation should also be performed with related parties, including the units to be in charge of management and operation of works to ensure that they are consulted and commented on the designs.

During the construction stage, the Project owner should announce promotion in mass media regarding construction activities and expected schedule, measures to support the people affected and the procedure for receipt of feedbacks from the community. The affected persons shall be informed of the Project policies and procedures to ensure no many changes in their future lives. In case of any questions about the Project, they can inform and obtain the support from the PMU.

The content and method of public consultation / announcement is as follows:

Items	Method of public consultation/announcement	Period	Person in charge
1. Detailed design drawings: Alignment alternatives	Meeting with the government of the ward/commune and relevant units; the representatives of the	Survey and design stages	the Consultant, PMU

	affected households.		
2. Land acquisition, clearance and compensation.	The ward/communal staff, together with PMU staff, shall consult with APs for initial assessments. Land acquisition and compensation plans shall be developed and discussed with APs before submission to authorities for decision. Policy announcement and explanation shall be made in meetings with APs.	Prior-implementation stage	the Communal People's Committee, PMU
3. Project implementation progress, monitoring mechanism and accountability	Meetings in residential blocks, posters and notices in public	The commencement stage and during implementation stage	the Communal People's Committee, PMU
4. Employment and wages of local labor.	Meeting between the Construction unit, local authorities/supervision board and the local	Prior-construction stage	The construction contractor, local authority and the community
5. Potential adverse impacts and mitigation measures	Combined with Item 2 and 3 above	Prior and during implementation stage.	PMU, construction contractor, the communal people's committee

2. Social accountability

The announcement of the proposed plans of the Project to the affected people and stakeholders during community consultation and field survey by the social assessment consultants is to make a paradigm for continuing public information during the project implementation. Moreover, as required at all public meetings, the affected always wish for meetings to regularly exchange information with PMU at the headquarters of CPC where the community will suffer from impacts during project implementation. Therefore, reports on resettlement plans and environmental management plans should reflect the responsibility of PMU in ensuring the regular announcement of information to the public.

In addition to regular meetings between the PMU and the affected communities in CPC offices, the public meetings in all communes where public consultation has been conducted have identified the need to establish the tight connection for easy and quick contact with the

PMU. The best way is to provide the phone number and address of the PMU in charge in all locations of the Project's items and the headquarters of all the communes of the entire Project's components.

3. Participatory supervision

In order for the project components to ensure its effecicney and necessasity, it is neccessary to have a monitoring plan with the participation of stakeholders such as the Department of Natural Resources and Environment, Department of Construction, Department of Planning and Investment, Department of Transport ... After completion, the direct management and operation agency/ unit of the project items should be involved in the design and construction proceses.

Together with the independent monitoring unit of the project, there should have a community-level supervision division to monitor project activities, especially activities related to resettlement, sanitation and the construction of various items. The supervision division will include representatives of local authorities, representatives of organizations such as the Women's Union, Fatherland Front, Veterans, Association, representatives of local people... This The supervision division in collaboration with independent monitoring unit of the Project will monitor the project activities based on indicators of social safety. Indicators of rehabilitation, production, environmental sanitation, traffic will be built to serve the monitoring plan of the Project. The grasping reality will help community supervision division report information related to the project progress, problems arisen during the project implementation to the PMU for promptly actions. The responsibility of this division is to collect feedback from the people and competent authorities as well as from the PMU. At the same time, people are also involved in the supervision, safety guarantee and sanitation in the construction phase.

The Community supervision division should be involved in the training plan on strengthening monitoring and evaluation of project activities, training on monitoring activity skills as a part of the participatory monitoring plan of the Project.

It is noted that the Resolution 80/ CP on community supervision for construction works in localities should be applied.

APPENDIX B7 - DESCRIPTION OF PREPARTION WORK INCLUDING ORGANISATION, INSTITUTION AND SUPERVISION, EVALUATION

Unit	Role and responsibility		
	Preparation for the sub-project	Implementation of the sub-project	Operation of the sub-project
CPO	Guide safety policy cadres of the province Project management unit (PMU) during preparation of the report for checking social environment impact assessment Consider and contribute ideas to the report for the province PMU to submit superior level	Guide the PMU cadres to implement Social environment management plan during construction; Supervise progress during construction; Gather 6-month environment reports months from the province PMU;	Guide Safety policy cadres of the province PMU to implement Environment management plan in the first year of operation; Supervise progress in the first year of operation; Gather environment reports from the province PMU;
The province People's Committee	n/a	The project owner is the highest responsible for environmental activities of the sub-project during construction;	The project owner is responsible for environmental activities in the operation phase including implementation of Environment Management Plan in the operation phase;
The province PMU	Engage a consultant and take overall responsibility for preparation of the Social environment impact assessment report and submit it for approval; Ensure that cadres are fully trained in environmental issues;	Be responsible for implementing the Environment Management Plan before and during construction; Ensure that details of the contract and bidding documents include environmental requirements; Conduct survey and supervision of environmental issues during construction;	Be responsible for implementing the Environment Management Plan in the first year of operation; Conduct survey and supervision of environmental issues in the first year of operation; Support the project owner to put environmental requirements in

Unit	Role and responsibility		
	Preparation for the sub-project	Implementation of the sub-project	Operation of the sub-project
		Coordinate the environment monitoring report for the Central Project Management Unit;	operation and maintenance procedures of the works;
The district People's Committee	Approve the Commitment to Environment Protection (CEP) of the sub-project in accordance with legal regulations of the Vietnamese Government;	Supervise implementation of the Environment Management Plan through their internal supervision system	Supervise implementation of the Environment Management Plan through their internal supervision system;
Community supervision board and members of local community supervision boards(CSBs [3])	Participate in consultation activities and define and prepare sub-projects; Contribute ideas to environmental assessment documents after the documents are introduced to them;	Participate in environmental supervision activities according to Vietnam law and according to training sessions	Participate in environmental supervision activities according to Vietnam law and according to training sessions
The construction supervision consultant	n/a	Undertake to train environmental courses for supervision consultants Participate in environment supervision according to approved EMP in the Social environment impact assessment report Prepare a supervision report and submit to the	n/a

[3] CSBs, established according to decision No. 80/2005/QD-TTg dated 18 April 2005 by the Prime Minister on promulgating Investment supervision mechanism of communities. Article 8 of Decree No. 80/2006/NĐ-CP provides communities with opportunities to check compliance, supervise implementation and evaluate investment results at the commune including environmental impacts.

Unit	Role and responsibility		
	Preparation for the sub-project	Implementation of the sub-project	Operation of the sub-project
		province PMU	
Construction contractor	n/a	Prepare Detailed field environment supervision plan to meet general requirements for an EMP of the sub-project; Allocate sufficient human resources to meet compulsory requirements and regulations of a field EMP;	n/a