

Initial Environmental Examination

April 2012

Vietnam: Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project

(Subproject: A Roang Hydropower Project)

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A ROANG HYDROPOWER PROJECT

INITIAL ENVIRONMENTAL EXAMINATION

**LOAN 2517-VIE: RENEWABLE ENERGY DEVELOPMENT AND NETWORK
EXPANSION AND REHABILITATION FOR REMOTE COMMUNES SECTOR
PROJECT**

CENTRAL POWER CORPORATION

April 13, 2012

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CURRENCY EQUIVALENTS

(as of 31 March 2012)

Currency Unit Vietnamese Dong

US\$1.00 = 20,837 VND

1 VND = 0.000048 US\$

ABBREVIATIONS

| | |
|-----------------|--|
| ADB | Asian Development Bank |
| CEP | Commitment to Environmental Protection |
| CPC | Central Power Company |
| EA | Executing Agency |
| ESDC | Environmental and Social Development Cell |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| DONRE | Department of Natural Resources and Environment |
| HH | Household |
| IEE | Initial Environmental Examination |
| MARD | Ministry of Rural Development |
| DARD | Department of Rural Development |
| MOIT | Ministry of Industry and Trade |
| NO _x | Oxides of Nitrogen |
| O&M | Operation and Maintenance |
| RP | Resettlement Plan |
| RoW | Right-of-Way |
| CREB | Central Rural Electricity Project Management Board |
| SEA | Strategic Environmental Assessment Environmental |
| SC | Supervision Consultant |
| SONRE | Section on Natural Resources and Environment |
| SO _x | Oxides of Sulphur |
| TA | Technical Assistance |

WEIGHTS AND MEASURES

| | |
|-----------------|-------------------|
| ha | hectare |
| km | kilometre |
| km ² | square kilometres |
| litres/s | litres per second |
| m | metre |
| m ³ | cubic metre |
| m ² | square metre |
| mm | millimetre |
| s | seconds |

EXECUTIVE SUMMARY

Objectives and Approach

1. The Central Power Company CPC (formerly known as Power Company No. 3) of Vietnam Electricity (EVN) commissioned studies in the past for the A Roang Hydropower Project, including an environmental assessment of the project in 2005. CPC has been trying to obtain funding for the project as part of a programme to increase power supply to the rural areas.

2. As part of the Loan 2517-VIE: Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project, ADB will provide funding for specific mini-hydropower projects for rural electrification in mountainous provinces of Vietnam. The planning for individual hydropower projects is carried out in two stages. The first of these stages consists of identification of projects and development of feasibility studies and the second involves the construction of these projects. A Roang project has been identified for consideration under the programme. Further feasibility studies are underway and this environmental assessment study is part of this process.

3. The project is a small (7.2 MW) hydropower dam scheme designed to provide electricity to the rural electricity system in A Roang commune. Under ADB guidelines, A Roang hydropower project is a Category B project, and as such, an Initial Environmental Examination (IEE) is required. A resettlement plan has also been undertaken as part of the Technical Assistance (TA). Vietnamese regulations only require hydropower projects with reservoirs larger than 300,000 m³ to have a full Environmental Impact Assessment (EIA). Projects of the size of A Roang hydropower plant require only that a Commitment of Environmental Protection (CEP) be made when the plans for the project are submitted to the relevant People's Committee.

4. The project consists of a concrete gravity dam, cresting approximately 8 m above the riverbed, an overflow spillway, intake works, a tunnel to pipe water to the penstock, a powerhouse and tail race. Water is taken from the A Lung River and delivered to the powerhouse and returned to the river some 1.3 km downstream. The water delivery system is designed to provide a maximum of 4.9 m³ to two turbines and supply peak power to the national grid system. In the dry season months, natural flows in the river are much reduced. For six continuous months, there is less than 2m³ of water and the powerhouse will operate for just a few hours to supply the evening peak requirement. As a result of the project, in the dry season months, the A Lung river will experience reduced water flow in the 1.3 kms of the river between the dam and the powerhouse. The river immediately below the powerhouse will experience changed conditions in the dry season as all the retained water is used over a short time span of a few hours to generate power.

Environmental Concerns and Impacts

5. No removal of houses is required but there is a loss of agricultural paddy land and fruit trees at the upstream end of the reservoir while some forest land will be lost at the dam site and other facilities of the project. The main potential environmental impacts of the project relate to:

- Human impacts with the loss of a small amount of residential land (0.5 ha) and 35 persons (17 HHs) will be affected temporarily while 778 persons (162 HHs) will suffer some sort of permanent loss of land. The loss of land is for agriculture and forest production land.
- Construction along some steep and hilly slopes with landscape will result to the scarring of land and loss of trees. The tunnel, penstock and access roads are on steep land. There is also potential for scarring and encroachment on existing land on down hill slopes that could result to siltation of the A Roang river bed.
- The project has been originally designed to maximize water use with no environmental flow being retained in the river system below the dam site. As a result, a 1.3 km section of river between dam and powerhouse will be denied water flow for approximately seven months of the year. Reducing water flow in the river has implications to fish and aquatic life, hence, a minimum environmental flow of 100 l/s will be maintained downstream of the a dam.
- The project is located in the buffer zone of the Sao La Nature Reserve. The site is approximately 5km northwest from the core zone of the nature reserve. The project site itself is characterized as a non-forest area but further downstream of the dam at about 12 km is a Special Forest Protection area under the Green Corridor project as defined by the World Wildlife Fund in 1994. In general, the A Roang area was identified in 1995 studies as an area of particular value for endangered amphibians and reptiles.

Environmental Mitigation

6. The main environmental mitigation measures included in the EMP are indicated below:

Table 1: Summary of Mitigation

| | Potential Impact | Mitigation |
|---|--|--|
| 1 | Construction impacts with destruction and scarring of land in steep mountain terrain | Implementation of detailed EMP attached to the IEE to include provision of catchments/cut-off drains, silt traps, masonry retaining structures, spoils planning, planting of grass and revegetation of disturbed areas. |
| 2 | Use of borrow materials | Borrow materials will not be derived from cultivable and arable lands but only from permitted and exiting quarry areas. |
| 3 | Loss of agricultural and crop land | Resettlement plan to be implemented with compensation package for loss of land & trees. |
| 4 | Reduced water flows in the 1.3 km section of the A Lung river. | 100 litres/s will be retained in the river system downstream of the dam to benefit fish and other aquatic life in the dry season. Conduct regular monitoring of river flow and the provision of environmental flow during the dry season. |
| 5 | Erosion in riverbed from tailrace discharge | Repair and/or extend the reinforcement of the downstream riverbed, as necessary. Provide stilling basin at the tailrace to prevent erosion and scouring. |

7. Aside from compensation for the loss of land and for the temporary use of land during the two-year construction period, funding is also incorporated in the budget for an environmental cell to strengthen the capacity the Central Rural Energy Project Management Board (CREB) which is the body that will implement the project on behalf of CPC.

Conclusions

8. There is no usage of water on the section of the river potentially deprived of water or the section of river immediately downstream of the powerhouse. A loss of agricultural and forest production land will be compensated for as recommended in the resettlement plan prepared for the project. The main impacts identified in this environmental examination are the result of construction activities and the potential long-term removal of water flow from the 1.3 km stretch of the A Lung river for more than half of the year and the potential impacts on aquatic species.

9. There is a need to ensure mitigation for impacts brought about by construction activities for the hydropower plant facilities including the building of 3.4 km of access road. The proposed Environmental Management Plan (EMP) attached to this IEE outlines the mitigation for the impacts of construction activities. The proposed retention of 100 litres/s environmental flow in the river system will also help reduce impact to downstream ecosystem. It is, however, not possible to fully determine the environmental impacts on aquatic life without further studies. It is therefore important to monitor the species present in downstream A Lung River and the species tolerance to changes in river flow conditions to enable any possible additional mitigation measures during project implementation.

10. It is important, also, that CPC as the EA, develops its internal capacity to implement and monitor the measures in the EMP. This has been designed into the project by requiring the setting up of an Environmental Monitoring Unit in CPC and the appointment of environmental & resettlement specialists.

I INTRODUCTION

A. Purpose and Scope of Environmental Report

11. A Roang Hydropower Project is a sub-project which has been identified under Loan 2517-VIE: Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project of ADB. The overall project will finance the development of between 5 and 10 mini-hydropower plants, each with a capacity of less than 7.5 MW in the northern and central provinces of Vietnam. The loan will finance the connection of these mini-hydropower plants to the national grid and the expansion of the low voltage network to supply nearby villages which are currently not electrified. The Project is expected to contribute over 30 MW of combined generation capacity to the national power system, and extend the medium voltage power network in remote areas of Viet Nam by 75 –100 kilometers (km).

12. This Initial Environment Examination (IEE) is undertaken as part of the overall feasibility study for the A Roang Hydropower Project and is designed to meet the requirements for environmental assessment under ADB's Guidelines on Environmental Assessment (2003). This study looks at the potential impacts of construction and operation of the project on the A Lung river and its watershed as well as impacts to the community of the proposed project.

13. The Executing Agency (EA) for the project is Central Power Company (CPC). This report and the Environment Management Plan (EMP) should be submitted to the District Office for Environment and Water Resources (DONRE) to assist in monitoring the project for environmental and permitting purposes.

14. An IEE along with a resettlement plan was conducted in 2005 by The University of Construction, Hanoi and the information contained therein has been updated and incorporated in this report. Public consultation meetings were organized by CPC on March 11, 2010 and January 7, 2011 to disclose information to the public. These meetings are described in Chapter VI. The minutes of the public consultation meetings and list of participants are included in the Annex of this document.

II DESCRIPTION OF THE PROJECT

A Category of the Project

1. ADB Categorization

1. The 7.2 MW A Roang hydropower project was screened, classified and assessed based on ADB's Environmental Assessment Guidelines (2003) and the Government of Viet Nam's Law on Environmental Protection (LEP). Using ADB's Rapid Environmental Assessment Checklist for hydropower projects (Annex 2), the project was classified as Category "B". An IEE is required to determine if there are significant impacts and if a more detailed impact assessment is necessary.

2. Vietnamese Environmental Assessment Requirements and Other Regulations

2. **Environmental Impact Assessment.** Requirements for environmental assessment in Viet Nam are laid down in Article 18 of the Law on Environmental Protection, which states when an EIA must be prepared. Projects that are likely to impose risks or have adverse impacts to national reserves, national parks, historical-cultural relics, natural heritage and on water resources of river basins, coastal areas and protected ecosystems are subject to an environmental assessment. A Circular issued by the Ministry of Natural Resources and Environment (MONRE) entitled "Guiding Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment"¹ gives detailed guidelines for Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA) and Commitment to Environmental Protection (CEP) including SEA, EIA and CEP report preparation, review and appraisal, monitoring, and confirmation of implementation of the mitigation measures.

15. The regulations² published in 2008 categorize which type of projects are required to undertake an EIA. With respect to the requirements for environmental assessment of hydropower projects, an "environmental impact assessment" report is only required for hydropower plants having reservoir areas of 300,000 m³ or above and for high voltage transmission lines with a length of over 100 km.

16. A Roang project has a reservoir area of 104,000 m³ and 26 km of 35 kV transmission lines, which connect to the national electricity grid system. As such, there is no requirement under Vietnamese regulations to undertake the type of IEE or EIA required under ADB guidelines and regulations. Power generation projects such as mini-hydropower plants and low and medium voltage transmission and distribution lines only need to submit a written CEP.

17. The Section on Natural Resources and Environment (SONRE) at District level is responsible for environmental management in the district/town territory. District People's Committees (DPCs) are responsible for approving CEPs³ and Provincial level environment protection agencies are responsible for certification of registration⁴. SONRE is also responsible for conducting environmental monitoring during project

¹ GOV's Circular No.05/2008/TT-BTNMT dated 08 December 2008

² GOV's Circular No. 21/2008/ND-CP dated 28 February 2008 and Article 24 of the LEP

³ Article 26 of the LEP

⁴ Article 17c of Decree 21-2008

implementation. However, given the current limited capacity of district level SONREs to undertake evaluation of environmental assessment reports, the Ministry of Industry and Trade (MOIT) is required to coordinate with the Provincial People's Committee (PPC) to ensure that the respective SONREs are assisted by provincial DONREs during the review and approval of written CEPs.

18. **Utilization of Water Resources.** For the use of water, there is also a requirement to obtain a permit under Water Resources legislation. Article 24 of The Law on Water Resources⁵ entitled "Issuing permits for exploitation and use of water resources" requires organizations and individuals that exploit and use water resources to obtain permission from the competent State agencies.

19. Article 64 of the Act entitled "the Management of the river basin planning" specifies that the agency managing the planning of river basins is the Ministry of Agriculture and Rural Development (MARD).

20. Decree No 149/2004⁶, Article 4 defines permit issuance principles. Permits are granted initially for 20 years (Article 7). Permits for smaller projects are usually granted at Provincial People's Committee level (Article 14). The permitting authority will also manage the permit and the dossiers of required information for the project.

21. Permit owners, among other requirements, are obliged to pay fees, take measures for safety prevention, keep data and information on water resources and make reports to the People's Committee (Article 18).

22. Article 21 "Order and procedures for issuance of surface water exploitation and use permits" defines what is required for a permit application i.e. what should be in the dossier accompanying the permit application. Among other things, information is required on the analysis of quality of water according to State's regulations. Also papers must be attached to the permit application regarding existing land use rights. There must be a written agreement on land use between the organization exploiting the water and the organization or individual having the land use right. The agreement must be certified by the competent People's Committee.

23. **Environmental Flow.** Decree No 112/2008⁷ prescribes the scope of environmental management protection requirements for integrated exploitation of hydropower and irrigation reservoirs (Article 1). The need for a minimum flow is established as "the lowest level of flow required for maintaining a river or a river section to ensure the aquatic eco-system's normal development and the minimum level for the exploitation and use of water resources by water users according to the priority level set in the river basin planning."

24. Reservoir construction must conform with the river basin planning approved by a competent state agency (Article 4) and exploitation and use of natural resources and environment in reservoir protection corridors and reservoir zones must be based on approved master plans (Article 8).

25. Dam owners shall annually formulate a water regulation plan for reservoirs and notify the People's Committee at all levels of the relevant localities in order to

⁵ Law on Water Resources No. 8/1998/QH10 May 20, 1998

⁶ Decree no 149/2004/ND-CP of Jul 27 2004 on the Issuance of Permits for Water Resource Exploration, Exploitation and use, or for discharge of Wastewater into Water Sources.

⁷ Decree No 112/2008/ND-CP of Oct 20, 2008 on Management, Protection and Integrated Exploitation of Resources and Environment of Hydropower and Irrigation Reservoirs.

reduce adverse impacts on people's production and life and the environment (Article 9.3). Water regulation plans for reservoirs shall be formulated on the basis of minimum flow requirements, among other things (Article 9.4).

26. The MONRE, according to Article 12.2, are to assume responsibility for and coordinate with the concerned ministries, branches and localities in specifying minimum flow requirements for reservoirs.

27. Despite attempts by MONRE to establish standards for determination of "Minimum Flow" for reservoirs through a Danida project⁸, no standards have up to this time been agreed for adoption by MONRE.

28. Land use permit for the project will be applied to the District People's Committee and water use permit will be applied to Thua Thien-Hue Department of Natural Resource and Environment (DONRE) later when financing is approved for the project.

29. **Cultural and Archaeological Resources.** On cultural and archaeological resources, the relevant laws and regulations are as follows:

1. Cultural Heritage Law June 2001,
2. Decree No. 92/2002/ND-CP November 11, 2002 relating to the implementation of some articles of the Law on Cultural Heritage,
3. Regulation on Exploration of archaeological excavations Decision No. 86/2008/QĐ-BVHTTDL December 30, 2008 of the Minister of Culture, Sports and Tourism.

30. Chapter II of the 2008 Regulations (Responsibilities of Organizations and Individuals when detecting archaeological sites) states that if organizations and individuals find archaeological sites and/or artifacts, they have the responsibility to protect, maintain the status quo at the location and promptly notify and hand the archaeological relics to the closest office of the Department Culture, Sports and Tourism or the Department of Culture and Information.

B Location and General Description

31. The A Roang hydropower project is located in A Roang Commune, A Luoi District in Thua Thien Hue Province. The project site is close to the main international Ho Chi Minh Highway 14. The project is about 25km from the centre of A Luoi District to the south and about 70km by road from Hue city to the southwest. The plant is located at 107° 23' Eastern longitude and 16° 07' Northern latitude. Figure 1 presents the location map.

32. The project is designed to take the waters from the A Lung river which has a small catchment area of only 46 km². The A Lung river is an upstream branch of the A Roang river which in turn feeds into the Bo river.

⁸ Integrated River Basin Management Project, Danida 2008 -2009

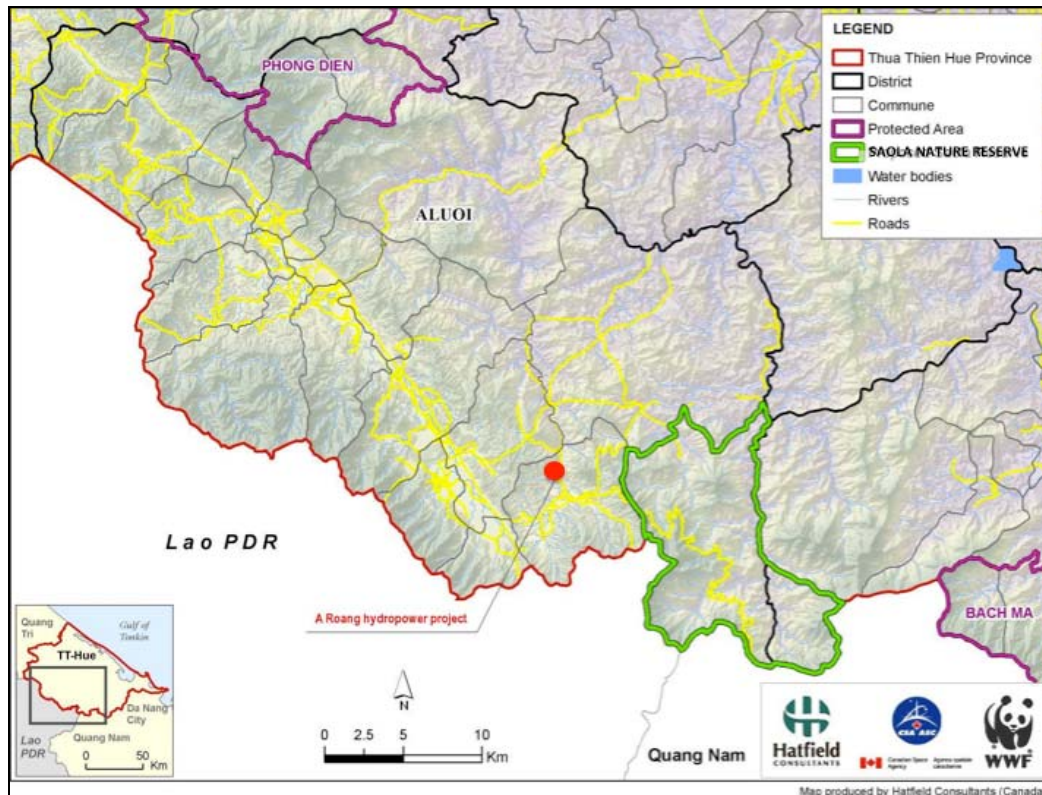


Figure 1: Project Location

Base Map Source: Thua Thien Hue Forest Protection Department

33. The main elements of the project are shown in Figure 2 and described as follows:

- A dam to be constructed 0.5 kms from the main state Ho Chi Minh Highway 14. It is on a rock platform and will be 13 m high with a width at the top of 28m;
- A reservoir with a volume of 104,000 m³ and surface area of 8.28ha;
- An intake gate on the right bank of A Lung;
- A tunnel with internal diameter of 1.8 m, 630 long which will be blasted through rock and soil in land covered by plantation forests;
- A pressurised tower;
- A penstock 1.2 m diameter 680 m long on the right bank of the river;
- A powerhouse with two turbines and transmission yard on the right bank of the A Lung River;
- Tail race, 300 metres long, with outfall to the A Lung river; and
- 3.4 km access road.

34. The reservoir formed by the dam is in the narrow, relatively steep valley bottom. When the reservoir is full, the water will back up more than 500 m and reaches a point about 50 m upstream of the A Lung river where some rice crops, forest land and a small amount of residential land are affected.

35. Apart from the left abutment of the dam, all the project construction and operations activity is on the right bank of the river. The water delivery system has a

calculated head of 173.3 m, which is designed to deliver a maximum of 4.9 m³/s to two turbines and generate 7.2 MW of power.

36. As a result of the project, in the dry season, the A Lung river will experience loss of water flow for approximately six to seven months over the 1.3 kms of the river between dam and powerhouse.

37. In addition, the project requires 3.4 km of access road to be constructed, of which 1.0 km will be temporary road for construction purposes. A one km access road is required to the dam site and dam construction area. This road will be extended a further 2.4 km down stream over steep terrain to give access for construction of the powerhouse and its eventual operation. Access is required to two construction material sites and a quarry and two access roads of 0.2 km and 0.5 km for construction of the penstock. Project roads will have a 3.5 m pavement constructed of soil and gravel with a total width of 6m to the shoulder edge.

38. Other hydropower infrastructures include permanent office facilities (0.25 ha) close to the dam location while an area of 4 ha is needed for temporary use close to the dam site for construction activities and camp facilities. A further 2.5 ha is required for construction activities, camp and earth disposal at the powerhouse location.

C. Construction Schedule

39. The construction of the proposed project will take 24 months until commissioning.

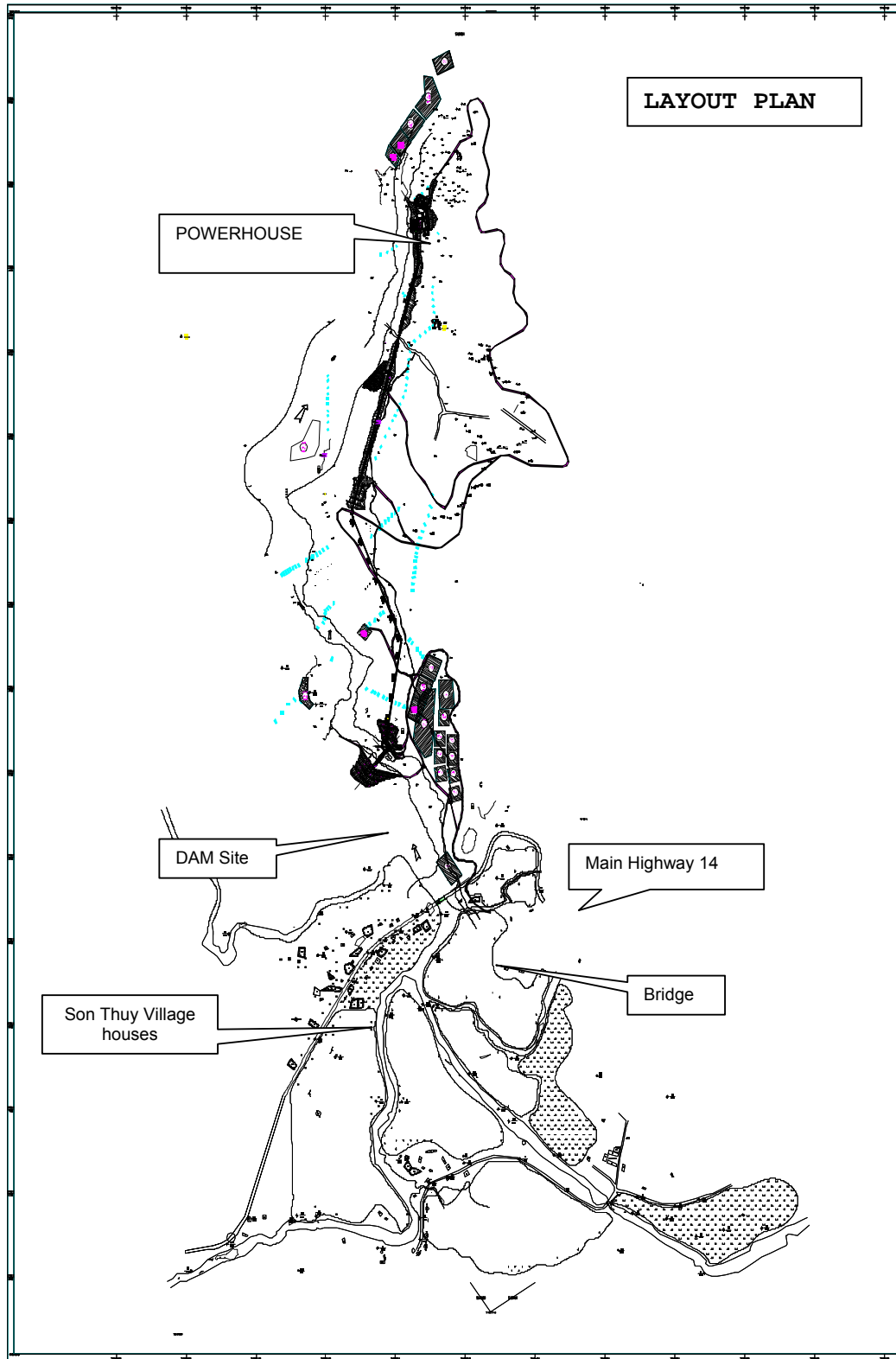


Figure 2: Project Layout Plan

III. DESCRIPTION OF THE ENVIRONMENT

A. Provincial and District Context

40. Hue, on the coast, is the provincial capital of Thua Thien Province and is administratively the only settlement in the province classified as a town. The province has 8 districts, which includes A Luoi District. A Roang, is located in A Luoi District and is one of 119 communes in the province.

Table 2: Population and Land Area

| | Area km | Population 1000's | Density Person per SqKm |
|---------------------|--------------------|------------------------------|------------------------------------|
| Vietnam | 331,051.4 | 86,024.6 | 260 |
| Thua Thien Province | 5,062.6 | 1,088.7 | 215 |
| A Luoi District | 123.3 | 43.3 | 351 |
| A Roang Commune | 5.7 | 2.4 | 421 |

Notes: Figures for Vietnam and Province were taken from 2009 Census. District figures were sourced from the 2008 A Luoi District Statistics Book.

41. Of the 123,273 ha which comprise the A Luoi District area, only 1.2 % (1,491.3 ha) is classified as residential and 4.0% is regarded as agricultural⁹. Forestry land, which includes both natural and plantation, represents 92,793 ha or 75.2% of the total district land area.

42. While Hue town is recognized as a World Cultural Heritage Site by UNESCO, in Thua Thien Hue Province, there are also a number of protected or proposed protected areas. The Sao La Nature Reserve is the closest designated site of special ecological interest to the project. The site is within the buffer zone of this nature reserve and is located about 5km northwest of the core zone. The project site is classified as a non-forest area but further downstream of the project site is a Special Protection Forest of the Thua Thien Hue Forest Protection Department. Table 3 presents the existing protected areas in Thua Thien Province and its estimated distance from the proposed A Roang hydropower project while Figure 3 presents the map of the Sao La Nature Reserve.

Table 3: Protected Areas Existing in the Thua Thien Hue Province and Provincial Borders

| Name | Area (ha) | Estimated Distance from Project (km) |
|--|------------------|---|
| Tay Nam Hue Proposed Cultural and Historical Site | 1,260 | 37 |
| Tam Giang-Cau Hai Proposed Marine Protected Area | 24,876 | 19 |
| Bac Hai Van Proposed Cultural and Historical Site | 14,547 | 74 |
| Hai Van-Hon Son Tra Proposed Marine Protected Area | 27,416 | 62 |
| Bach Ma National Park | 22,030 | 25 |
| Sao La Proposed Nature Reserve | 58,000 | 10 |
| Dakrong Proposed Nature Reserve | 40,526 | 40 |
| Total | 188,655 | |

⁹ A Luoi District Statistic Book 2008

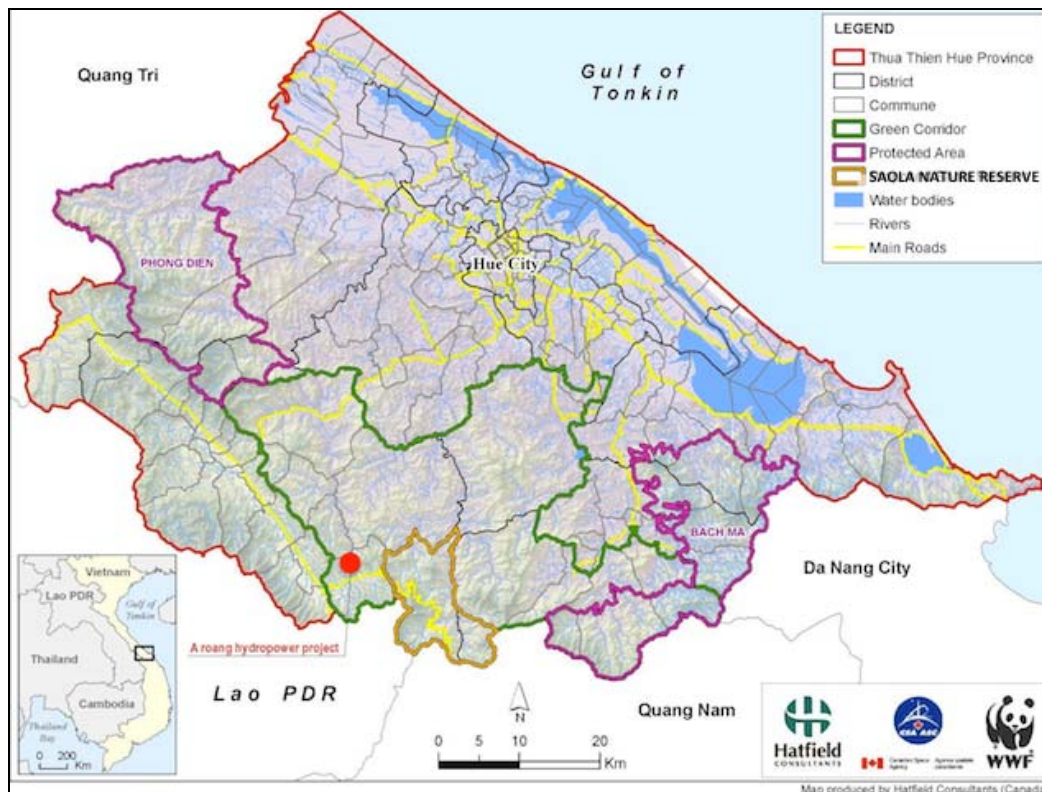


Figure 3. Map of Protected Area and Nature Reserve

Note: The Sao La Nature Reserve was officially declared in February 2011 based on the study from the Green Corridor Project

Source: The Green Corridor Project, Thua Thien Hue Forest Protection Department.

43. None of the protected areas listed in Table 3 are close to the A Roang project site. However, the proposed hydropower project is within the Green Corridor project area in Thua Thien Hue Province. This is the area between Bach Ma National Park and Phong Dien Nature Reserve, and is adjacent to the Xe Sap BCA in Laos. The project was initiated in 1984 by the WWF and supported by the World Bank - Global Environmental Facility (GEF). The general forest area has been identified as one of the highest conservation priorities in Vietnam. It is one of the last remaining lowland wet evergreen forests, and supports populations of threatened species. It also includes some of the longest remaining stretches of Lowland River, with intact forest habitat in Vietnam. The Green Corridor project area covers approximately 134,000 ha of Central Viet Nam and is composed of all or parts of the three districts of a Luoi, Huong Thuy, and Nam Dong.

B Physical Environment

44. The proposed project is located between altitudes 290 m and 465m about 7.5km from the Vietnam -Lao border.¹⁰

¹⁰ Feasibility study of A Roang by University of Construction Hanoi 2005.

45. **Topography.** The project area is in a narrow valley, on the Western Side of Truong Son range. The mountains run in a North West-East South direction, with the highest peak at 1,030m in the catchment area. The topography is strongly dissected by small rivers running to Rao Nai river - A Lung rivers.

46. **Geology.** The geology of the area of the A Roang hydropower plant is characterized by Quaternary sedimentation and magmatic rocks of the Que Son complex. The soil types in the area are:

- Yellow-red soil on clay stone and yellow soil on magma rocks on the hill sides
- Alluvium soil accumulates in the flat area above the dam site and main road. The soil is more than 1m deep, rich in quality and currently used for irrigation of rice land with more than 70ha and also for vegetable farms.

47. **Hydrology.** The A Lung river is part of the Huong river basin which consists of 28 rivers covering an area of 2,830 km². The main branches of the Huong River are Ta Trách with a catchment area of 779 km², Huu Trách river with a catchment area of 729 km² and the Bo river with a catchment of 938 km². Before reaching the sea, the Huong River basin feeds a lagoon and estuarine system that extends about 70 km along the coastline with many small links to the sea.

48. The catchment of A Roang Hydropower plant had no surveyed water flow data prior to Aug 2010 and annual flow has been interpolated from flow and rainfall data from the Thuong Nhat station on the Ta Trach River which is a tributary of the Huong river.

Table 4: Average Monthly Discharge (m³)

| Station | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All year |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|----------|
| Thuong Nhat | 10.6 | 6.3 | 4.6 | 4.3 | 8.7 | 8.5 | 5.9 | 7.8 | 16.6 | 49.3 | 44.0 | 26.1 | 16.1 |
| A Roang | 2.35 | 1.38 | 1.01 | 0.96 | 1.93 | 1.88 | 1.30 | 1.72 | 3.68 | 10.9 | 9.73 | 5.78 | 3.55 |

Notes: Thuong Nhat station represents the average discharge covering the years 1981 – 2007. A Roang figures are interpreted using Thuong Nhat data.

49. While February is the month of least rainfall, the lowest flows in the river are experienced later in April as it takes some time for groundwater tables to be recharged. From February to August, there is an average of less than 2 m³ flow in the river. The smallest daily flow experienced in the A Lung river is estimated as 0.43 m³.

50. There are two small streams located at the left and right bank of the A Lung River at the section between the dam and powerhouse where the low flow conditions will occur during the dry season. These two streams with consolidated catchment area of 3.0 sqkm will augment river flows to the A Lung River by about 45l/s.

51. **Climate.** Temperature at A Luoi station, the closest meteorological site indicate that the coldest month is January with average daily mean temperatures of 16.8 degrees C while May, June, July and August are equally warm at around 24.5 degrees C.

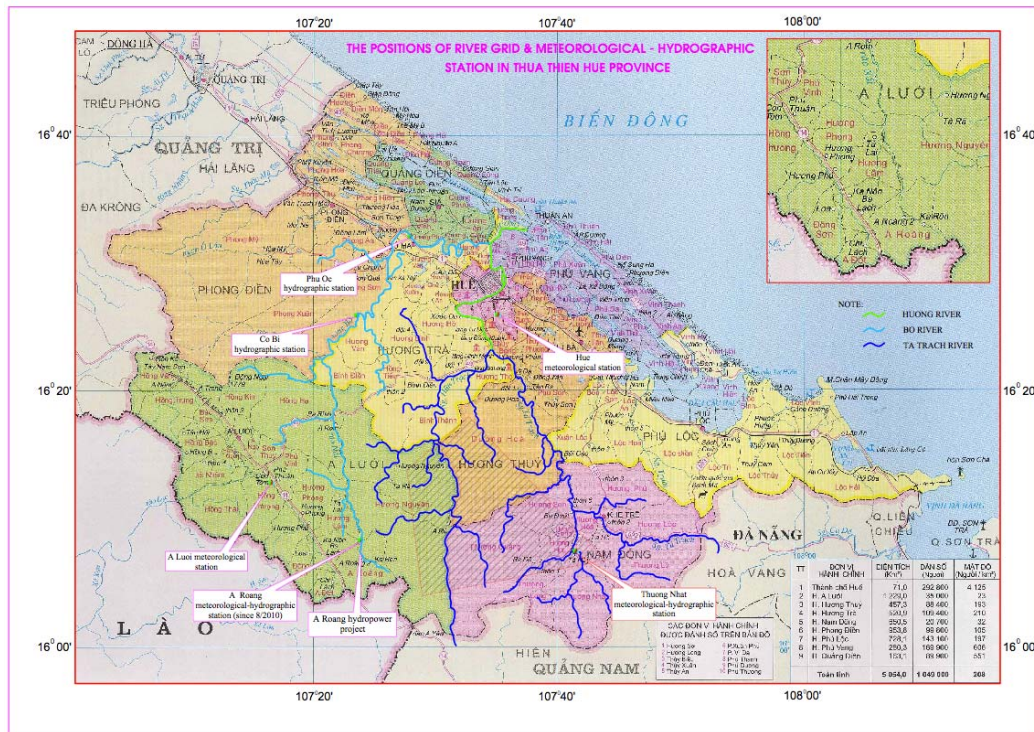


Figure 4. Map of Rivers and Hydrographic Stations in Thua Thien Hue Province

52. The rainfall regime in the general area of the catchment is dependent on the monsoon, topography, elevation and the annual rainfall. The rainfall is distributed unevenly over the catchment area and increases from east to west. At the same latitude, Hue has 2865mm of rainfall while Nam Dong has 3603mm. Rainfall intensity increases gradually from North to South from Bo river to Ta Trach river.

53. At A Luoi station, highest rainfall intensity occurs between August to December with the highest rainfall in October and November when nearly 50% of the yearly rainfall occurs. Frequent tropical storms affect the region and pass through Thua Thien Hue Province from the South China Sea. The combination of the South West and North East monsoons can result in heavy flooding. The main cyclone season is from September to December but from April to August there can also be storms and rainfall is unpredictable and can be very heavy. The highest recorded in rainfall in one day is 758mm at A Luoi. Water levels in the river and side streams increase very quickly causing flood conditions and are then subject to equally quick reductions in flow.

54. The months of January, February and March are driest with February only receiving 44 mm. Hot dry conditions can persist with no rainfall for periods up to 20 days.¹¹

¹¹ Climate Change Impacts in Huong River Basin, Thua Thien Hue Province, MONRE & Netherlands Climate Assistance Program Apr 2008

Table 5: Average rainfall at the Meteorological Stations in the Area (mm)

| Station | Month | | | | | | | | | | | | Annual |
|-------------|-------|------|------|------|-----|-----|------|-----|------|-----|-----|-----|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | |
| Hue | 106 | 58.8 | 43.7 | 55.5 | 129 | 112 | 69.4 | 139 | 381 | 756 | 645 | 363 | 2865 |
| Nam Dong | 101 | 49.6 | 52.6 | 90.1 | 228 | 215 | 138 | 233 | 455 | 974 | 730 | 337 | 3603 |
| A Luoi | 64.0 | 44.0 | 60.5 | 161 | 246 | 198 | 158 | 226 | 428 | 905 | 760 | 332 | 3584 |
| Thuong Nhat | 80 | 43 | 56 | 101 | 222 | 229 | 146 | 235 | 380 | 917 | 684 | 288 | 3382 |

Source: A Luoi data from 1976 to 2008

Notes: Thuong Nhat station is a hydropower station on the Ta Trach River. Data was taken from 1979 to 2008.

C. Ecological Resources

1. Forest Resources

55. The original native forest in the general area is semi-tropical evergreens with varying levels of cover. There has been significant destruction of forest cover with shifting cultivation practices and burning by migrant hill tribe peoples. In addition, there was much destruction during the war. As a result, forest cover is highly fragmented. The proposed site of the hydropower project is currently characterized with secondary growth and plantation forest composed of Acacia and shrubs. A Luoi District has, however, a forest cover of 75% including lands reforested for commercial use. The Sao La Nature Reserve in A Roang Commune has significant natural forest cover and is one of three areas which are regarded by World Wildlife Fund (WWF) as having the most intact evergreens in the province. As part of the effort to protect and maintain the biodiversity rich forests of the area, WWF has recommended that special attention be focussed on Sao La Nature Reserve.

56. The forest also provides non-timber forest resources for local ethnic minority groups. Many individuals earn more than half of their income from these products. The gathering of rattan from the forest, for instance, is the main source of income for many of the men from A Roang Commune.

2. Wildlife

57. WWF surveys¹² have shown that many threatened species are found in the general area of the Sao La Nature Reserve. This includes 15 reptiles and amphibians and six bird species. The Green Corridor area is also home to Vietnam's greatest number of white-cheeked crested gibbons, one of the world's most endangered primates. The Corridor is also believed to be the best location in Vietnam to conserve the Saola, a unique type of wild cattle only discovered by scientists in 1992.

58. Specific surveys for WWF focussed on Herpetofauna (amphibians and reptiles) and A Roang was chosen as one of the four focus areas because of the amount of evergreen forest still existing. The survey resulted in the identification of 93 species of amphibians and reptiles: 43 species of amphibians; 27 species of snakes; 16 species of lizards; and seven species of turtles. The total number of species recorded from the survey of these four points represents 44% (93/210) of the known herpetofaunal diversity of the upland area between the Ca River (Quang Tri

¹² Green Corridor Program 2004 – 2008 WWF & Forest Protection Department of Thua Thien Hue province, supported by the World Bank - Global Environmental Facility (GEF)

Province) and Da Rang River (near Gia Lai Province's southern border): 64% of the known amphibians; 30% of the known snake diversity; 32% of the known lizards; and 77% of the known turtle diversity. A total of 33 threatened species were recorded during the survey, including ten species of amphibians and 23 species of reptiles.

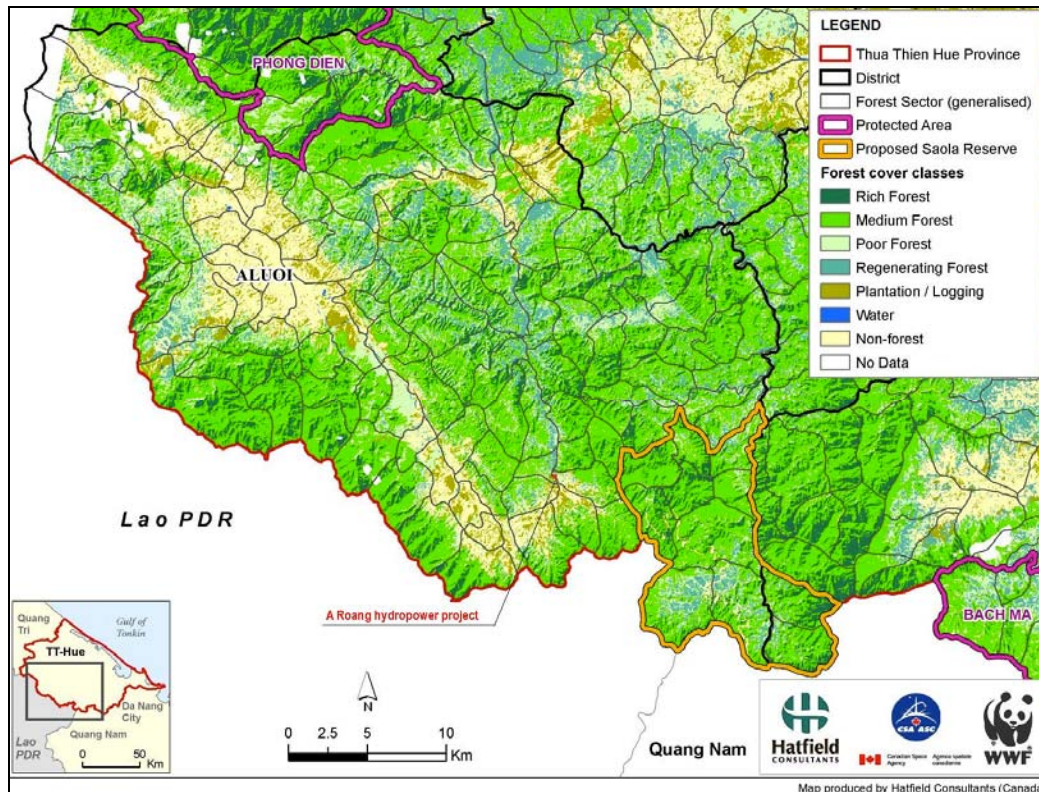


Figure 4. Forest Classification of Project Site and A Luoi District

Base Map Source: Thua Thien Hue Forest Protection Department

Table 6: Evaluation of Survey Sites for Herpetofauna Conservation Value

| Criteria | Huong Nguyen | A Roang | Thuong Lo | Duong Hoa |
|-------------------------|--------------|-----------|-----------|-----------|
| Diversity | 3 | 4 | 2 | 1 |
| Rare/threatened species | 1 | 3 | 3 | 2 |
| Forest area | 2 | 4 | 3 | 1 |
| Habitat quality | 2 | 3 | 2 | 1 |
| Human disturbance | 1 | 3 | 2 | 1 |
| Total | 9 | 17 | 12 | 6 |

Source: WWF survey carried out in August and September 2005

59. An evaluation of the four survey sites (Table 6) showed that A Roang scored highest for conservation value and led to WWF recommending that a species and Habitat Conservation Area be set up in the A Roang area, specifically at the Sao La Nature Reserve, to protect reptile and amphibian fauna. It was also stated that special attention should be focused on the forests of A Roang (below Ho Chi Minh Road).

3. Fish and Aquatic Resources

60. The freshwater river environments of Vietnam are credited with a rich flora and fauna biodiversity including species of fish, shrimp, crab, snail, mussels, amphibians, insects and plants. Countrywide, there are 20 species of freshwater weeds; 1,402 species of algae; 782 of invertebrates; 544 of fish species and 52 species of crabs¹³.

61. Commercial fisheries make an important contribution to exports and are worth more than US\$ 2.25 Billion annually to Vietnam. The major part of this figure is from marine fisheries, but aquaculture has become increasingly important. Freshwater aquaculture production environments include ponds, ditches, cages, net enclosures and pens in reservoirs, rivers channels and paddy fields. In the north, pond poly culture is the most important farming system using carp and bighead. The main area for aquaculture, however, is in the south of Vietnam and especially with the use of cage culture in the Mekong and Bassac rivers and catfish, carp and snakehead are the main species. In the Mekong Delta, prawn monoculture is practiced extensively in rice fields. Tilapia in cultured ponds has also become popular. Pond culture has been encouraged nationwide as part of the drive against poverty alleviation, diet improvement and the prevention of malnutrition. The Government supplies extension services free to farmers.

62. While aquaculture has spread with the use of introduced species, native aquatic species numbers in natural rivers and lakes are down. Only scarce quantitative data are available for inland aquatic ecosystems, and the extent of the deterioration of freshwater biodiversity is still poorly known. However, decline has been documented in various reservoirs and lakes. For instance, between 1998 to 2001, in the Ba Be Lake, 20 species have disappeared.

63. There are approximately 3,600 reservoirs of various sizes in Viet Nam. Most dams and reservoirs have multi-purposes for flood control, irrigation, hydropower, and water supply and most are more than 20 years old. Only 15 percent are classified as large or medium (capacity of over 1 million m³ or a height of more than 10 meters)¹. These structures have been constructed without provisions to allow migratory fish movement up and down the river and with little consideration for environmental flows to protect aquatic life.

64. At A Roang, the A Lung is a mountain stream near the head of the river basin. It is characterised by low temperature and high dissolved oxygen content. There are few large fish in the river and fish is not an important source of protein for local people. Little data is available but each of the relatively small catchments that discharge into the sea along the north and central coastal areas of Vietnam have complex aquatic systems that, are all very different from catchment to catchment. As with the herpetofauna, these valleys exhibit a high rate of endemic fish species and there are likely to be endemic species in these rivers which have not been described as yet,¹⁴

¹³ Water Environment Partnership in Asia (WEPA)

¹⁴ Kottelat, Maurice & Whitten, Tony, 1996 *Freshwater biodiversity in Asia : with special reference to fish* / Maurice Kottelat, Tony Whitten World Bank, Washington, D.C

D. Socio-Economic and Cultural Environment

1. Socio-economic features

a) Population

65. The population of the general project area is dominated by ethnic minority people apart from a small minority of Kinh people who live in town along the main Ho Chi Minh highway and at the A Luoi District Centre. The population at A Roang commune is comprised 100% by the Ta Oi minority group.

66. According to the 2008 population statistics, the District had 42,392 persons, of which 6,493 were classified as urban. The natural rate of increase (year on year) was 1.47%. Rate of people below employment age was 5.9% and over the employment age was 3%. There are 19,221 persons with working capabilities, covering 45.3% of total population. Migration in the district occurred at low rate, covering of 0.03% in communes and 0.025% in the town.

67. The commune has 9 hamlets, 24 groups of residents with 485 households and 2,371 persons (as of end of 2008). Women make up 1,188 of the population.

Table 7: A Roang Commune Population and Households

| | Hamlet name | 2003 | | 2004 | | 2008 | |
|---|--------------|------------|---------------|------------|---------------|------------|---------------|
| | | No.of HH | No.of persons | No.of HH | No.of persons | No.of HH | No.of persons |
| 1 | Huong Son | 45 | 263 | 47 | 268 | 60 | 296 |
| 2 | A Ka 1 | 43 | 257 | 44 | 263 | 58 | 287 |
| 3 | A Ka 2 | 46 | 268 | 48 | 274 | 55 | 283 |
| 4 | Ka Lo | 37 | 227 | 38 | 230 | 57 | 265 |
| 5 | A Roang 1 | 58 | 325 | 61 | 331 | 82 | 353 |
| 6 | A Roang 2 | 38 | 215 | 40 | 220 | 55 | 244 |
| 7 | A Ho | 18 | 106 | 19 | 109 | 68 | 307 |
| 8 | A Min | 36 | 231 | 37 | 235 | 27 | 131 |
| 9 | Ka Ron | 48 | 264 | 50 | 267 | 55 | 273 |
| | Total | 369 | 2156 | 384 | 2198 | 517 | 2439 |

Source: District Statistics Books

68. For the people in the project area, living conditions are relatively poor, and literacy is quite low. Households tend to have large families and birth rates have traditionally been high at 24.8 births per 1000 population in 2002. This was reduced to 18.4 in 2008, which is much closer to the current national figure of 16.31. Large families are normal in the area with 8-19 children as common.

69. In recent years, the living conditions of the local residents have changed significantly. In town areas, homes are connected to the national grid. Traditionally the people in the area are hunters and gatherers. Swidden type agriculture is still practiced in the area and on the hillsides above the A Roang project reservoir site. The people have tended to become more sedentary as they have been allocated

land on a short term basis and encouraged to plant trees on a large scale for paper making. Economic activity has increased in the district with improvements in agriculture, industry and services. Agriculture is shifting gradually from self-cultivation and self-supply to goods production; animal breeding has developed quickly and more labour is involved in the service sectors. Because the area is generally poor, Government poverty reduction programs have focused on the area. For instance one of the programs in the area has assisted in the replacement of temporary, thatched and bamboo cottages with the provision of more substantial housing.

70. Many at A Roang still rely on land cultivation, farming, and gathering of materials such as rattan from the forest. By end of 2008, the A Roang commune still had 173 poor households (HH)s, representing 36.1% of the HHs in the Commune.

b) Agriculture

71. In recent years, the area productivity and yield of crop plants of A Luoi district have increased. Crop plants are mainly wet rice, dry rice and a variety of vegetable. Food plants here are mainly rice, manioc and local corn. The main fruit trees grown are banana and orange and commercial trees are rubber and cinnamon. Vegetables are mainly potato and cabbage and productivity tends to be low in comparison with the province as a whole.

c) Production and breeding

72. Cattle, pigs, buffaloes, goats and poultry are all kept by individual families in the district. Numbers of buffaloes have increased to meet the extra help in agricultural fields and for soil excavation. The number has increased significantly in recent years with a change from 1,523 buffaloes in 2001 to 2,443 buffaloes in 2008.

73. Cattle is highly valued and is bred by many families, as this can bring significant increased family income. The number has increased substantially from 4,095 cows in 2002, to 7,243 cows in 2008

74. Pigs are also important because the investment is relatively little and many HHs raise pigs including sows, piglets and boars. However, there has been a shift away from pigs and total number of pigs was down from 7,192 pigs in 2008 to 7,414 in 2001. Goat production by comparison have increased substantially and in 2008, there was a total of 3505, compared to a mere 164 in 2001. The number of poultry in the district was 62,927 in 2008.

75. At the A Roang project area, animal breeding is also one of the main income earning activities of the people. As of 2008, total number of livestock in the A Roang commune was 1,878, comprising 413 buffaloes, 396 cattle, 843 pigs and 226 goats.

d) Aquaculture

76. The whole district in 2008 had 184.9 ha of fish ponds and pools used for aqua-products. The fishing yield for the year was 15.0 tons of fish from rivers and 175 tons from aquaculture. The total value of fish was worth 450 million VND. A Roang commune also has 20ha of pond area for aquaculture products.

e) Forestry

77. Much of the forest in the area has been destroyed in the recent past. In the last ten years, there has been focus by local government on the management of

forestry and forest land. Up to 2001, there was little interest in planting trees, but between 2002 and 2004 alone, the district has planted 1,384 ha of recovered forest and built up 1,112 ha of protected forest. This meant that forestry production value of the district has increased substantially and reached 20.937 billion VND in 2008.

f) Industry and small industry and handicraft

78. Industrial activity has been insignificant in the local economy. Recently, however, the sector has the tendency for strong development and production value has increased from 1,586 billion VND in 2001 to 4,199 billion VND in 2008. Industry and handicrafts are mainly by individual businesses focusing mainly on the agricultural processing. Other industrial businesses include drinks production, textiles and wood processing.

2. Rural infrastructure

a) Transportation system

79. The transportation system of A Luoi District has received heavy investment recently, and all 21 towns and communes in the District are connected by developed roads to the District centre. However, some sections of the roads going to the project site are earth-paved and narrow.

b) Irrigation system

80. The irrigation system at A Roang commune is poorly developed. The source of water for agricultural production is mainly from side streams rather than irrigation systems.

c) Telecommunication system

81. As of 2008, all communes in the District are provided with telephone.

d) Electrical power system

82. According to the 2008 Statistics Book, all 21 communes of the District have access to the national grid. 94.6% HHs in the A Luoi town centre uses electricity, which is up from 87.09% in 2002. In A Roang commune. the rate is lower at 80%.

e) Health care

83. All districts in the Province have health care establishments with 176 doctors and pharmacists. There is one General Hospital with 80 beds, 5 general Clinics and 63 Medical Centres. There are also 21 health care firms with 65 beds.

f) Education

84. Education is a priority and in A Luoi district and the Thua Thien Hue province as a whole. As of 2008, the whole district has 21 primary schools, 5 secondary schools, 3 high schools with a total of 585 teachers and 9,823 pupils. All communes in the District require special educational needs for the eradication of illiteracy and introduction of primary education.

g) Domestic water supply and solid waste disposal

85. There is no central water supply system in the area and people generally use supplies from the steep side streams, which are piped to individual houses using plastic pipes or bamboo. According to District statistics, the number of HHs who use clean water is 62.1 % for A Luoi District and 77.5 % for A Roang Commune.

86. There is no official solid waste collected and waste is scattered or dumped in informal areas where it pollutes ground water and water resources in the area.

87. A survey of the A Roang stream (October 2005) showed that the quality of spring/river water in the project area is within the permitted limits according to Vietnamese standards (TCVN 5942-1995). For total coliform, however, the water quality was found to be beyond the permitted limit of the standard 505 BYT/QD and water needs to be boiled for cooking purposes. This is a consequence of there being no sanitary toilets in the villages and the use of the stream by livestock.

4. Site of Archaeological and Historic Importance

88. Various archaeological locations and remains are to be found in Vietnam and the SE Asian mainland, in general, including prehistoric (Neolithic, Bronze-Iron age), pre-Ankorian and Ankorian sites.

89. No archaeological or cultural sites have been determined in the project area but there are procedures set down relating to chance discoveries of an archaeological nature.

IV SCREENING OF ENVIRONMENTAL IMPACTS & MITIGATION

90. The ADB checklist for hydropower projects was used to screen for any potential impact and all impacts identified are addressed in the EMP. The checklist is attached in Annex 2 of this document. Impacts, which were determined as having environmental implications, are considered further and where significant impact occur mitigation has been provided.

A. Project Impacts

1. Positive Impacts

91. As a result of the overall Loan 2517-VIE, an additional 25–50 villages and about 3,000–5,000 households are expected to be provided with electricity in Vietnam. Specifically, the A Roang hydropower project aims to supplement power to the electricity grid system to supply about 384 households with a total population of around 2,198 in A Roang commune. With the further development of the national electricity distribution system, the people of A Roang, A Luoi District and the Province of Thua Thien Hue as a whole will have the convenience of reliable power twenty fours a day for domestic and business activities. Power supply will also include those for cooking and domestic heating for those who can afford it. The project is expected to reduce the pressure on the use of timber for heating and cooking purposes.

92. The project will also provide unskilled jobs during the construction phase and a limited number of jobs during the operational phase. This will be a bonus for the workforce in this predominantly agricultural community. However, skills and capacity development of the locality are needed to meet the employment demands of the project during the construction and operational phases.

93. Hydropower is a clean and renewable source of energy and avoids contributions to pollution loads, which would result from the alternative use of thermal electricity generation. Hence, it is environment friendly. Currently, gas is the main source of energy in the country (43.7%) with coal also responsible for 14.6%. Hydropower only constitutes 35.3% and Vietnam imports significant amounts of its energy from China. Increased hydropower generation will reduce dependence on fuel and power importation.

94. Thermal power generation plants are also known for a large variety of toxic emissions i.e. carbon dioxide (CO₂), particulate matter (PM), sulphur dioxide (SO₂), carbon monoxide (CO) and Oxides of Nitrogen (NO_x) etc. The following table provides a comparative analysis of estimated emissions of CO₂ from a power station generating the same amount of energy over a 30-year period using oil, gas and coal as a fuel source. Discharges of between 0.20 and 0.36 million tonnes of carbon dioxide are saved over a 30-year project life by using hydropower rather than fossil fuels. The A Roang project will, therefore, contribute to reduction in carbon emissions by avoiding the alternative burning of fossil fuels.

Table 8: Comparative Analysis of CO₂ Emission using Oil, Gas & Coal Generation

| Fuel Source | Oil | Gas | Coal |
|--|------------|------------|-------------|
| Grams CO ₂ /Gwh | 297 | 232 | 410 |
| Total Saving (million tonnes CO ₂) | 0.26 | 0.20 | 0.36 |

Note: Assumes generation of 2897 GWh per year (28.97x10⁹ kWh/year over a 30 year project life)

2. Adverse Impacts

95. **Loss of Land.** No houses will be lost as a result of the project. Land requirement for the project will affect a total of 668 persons or 146 HHs. 35 persons (5 HHs) will be affected temporarily while 633 (141 HHs) will suffer some sort of permanent loss of land. Among the HHs whose land will be permanently affected, 87 (395 persons) will lose more than 10 percent of their land holding and 11 of these HHs will lose more than 70 percent.

Table 9: Land Requirement during Construction and Operation

| Type of Impact | Area (ha) | Number of Affected Persons |
|--|--------------|----------------------------|
| AREA OF TEMPORARY IMPACT | | |
| Work area, camps and area for construction materials and equipment | 0.09 | 35 (5 households) |
| AREA OF PERMANENT IMPACT | | |
| Reservoir | 35.88 | 468 (92 households) |
| Draw down Zone | 8.28 | |
| Head works | 7.23 | 15 (5 households) |
| Access roads and camp area | 13.69 | 105 (35 households) |
| Service zone | 3.26 | 45 (9 households) |
| Total | 68.43 | 668 |

Source: Project Due Diligence Report

Note: Some HHs and affected persons are impacted by more than one project component.

96. Around 48.2 percent (32.93 ha) of permanently affected land area is production forest (Table 9). The project will affect 26,856 trees, most of these are contained in the production forest. The trees of commercial value also include eucalyptus, acacia and mulberry.

97. Agriculture is the second largest land type that will be affected with an area of 17.36 ha, and of this 14.67 is paddy rice. The project will affect some small structures (cow shed and a farm hut) and 15 graves with a total area of 26 square meters.

B. Construction Impacts and Mitigation

1. Impact of Quarry Sites for Construction Materials

98. Stone is available for construction purposes at Huong Phong quarry located about 20km from the site close to Ho Chi Minh Trail (National Highway 14). This is a large working granite quarry, which is currently used for road construction material. Fill areas and one quarry area have been identified close to the site. As with stone, other materials and equipment can be easily brought to the site from the main road adjoining the site. Particular consideration will be given to any quarry and fill areas on completion of works with a tree planting programme. The soil and rockpits (quarry) should be planted with trees, shrubs, and grasses.

2. Impacts of Construction Activities

99. **Contamination of Water.** There is potential for water contamination from construction activities and runoff of materials into the river at the dam and

hydropower sites. The main construction activities for work in or close to the river will be scheduled in the dry season and bunds will be created to channel the river away from dam abutment construction and powerhouse construction activity.

100. **Loss of Topsoil and Erosion.** Soil will be impacted because of (a) loss of topsoil, (b) failure to refill and revegetate borrow areas and temporarily used land, (c) erosion, (d) soil contamination by materials used for the project, and (e) failure to reutilize displaced earth during the construction period. The penstock will be constructed on steep slopes. There is potential for the penstock construction to cause the scarring of the landscape and for the road material to cause runoff of sediments on the slopes. The construction activities could also result to accumulation of wastes that need to be properly handled in a waste disposal area.

101. To avoid slippage of stone and earth material, stone gabions as retaining structures will be used to prevent slippage of soil adjacent to the penstock and on certain road sections. Maximum use will be made of material in fill areas and there will be proper spoil planning particularly on steep slopes with bench terracing for high cut areas to avoid any runoff of material down slope. Trees should be planted to consolidate and re-vegetate the area in the penstock, tunnel, roads and construction areas on completion of construction works.

102. In all cases, erosion can be minimized by regular rehabilitation of areas not in use for project activities during construction. Rehabilitation may include (a) immediate revegetation of slopes to minimize erosion using fast-growing species and different functional groups of plants for keeping soil in place, (b) use of topsoil removed and stockpiled from project areas, (c) installation of sediment runoff control devices, and (d) erosion and revegetation success monitoring.

103. **Generation of dust.** The main impact on air quality during construction will be increased dust levels from the construction machinery, tunnel construction, rock blasting, foundation excavation, cement mixing, handling of materials, movement of vehicles, and road construction. The construction activities and movement of construction vehicles in earth-paved roads will likely result to the generation of dust. In addition, batching plant operation will likely generate dust emission. These construction activities could cause hazards to the communities and also affect vegetation in the construction area. Appropriate mitigating measures to reduce dust emission should be employed. However, these impacts will cease following the completion of the construction activities and the vegetative stabilization of slopes and bare ground.

104. **Noise.** During construction, noise and vibration will be generated from vehicular movements, sand and aggregate processing, concrete mixing, excavation machinery, construction noise, and blasting. Noise levels in the construction area may have minimal impact on the residential communities as these are located quite far from the construction sites. However, movement of heavy-duty trucks on existing roads could cause nuisance to residents living near the roads.

105. Noise or any blasting works may, however, pose adverse impacts to the floral and faunal species in the vicinity.

3. Road Access and Traffic

106. Road access to the site is quite narrow in some sections but the project site is away from the nearest A Roang village, which is on main Highway 14. There will be some problems of construction traffic affecting local activities such as road accidents

and spill of construction materials. Hauling and construction vehicles should be required to observe caution and to slow down and to observe caution particularly when passing through narrow road sections and near village areas.

4. Construction Site and Camp Impacts

107. The construction of the project will be manpower intensive and where possible local labour force will be used. The contractor will require temporary labour camps at the dam and powerhouse sites. There will be a total workforce of approximately 150 staff during peak construction activity. The contractors will employ manual labour needs from the District. The camps for workers from outside will be away from A Roang village.

108. The construction camp has the potential to cause environmental impacts in terms of solid and wastewater generation. Clauses will be placed in construction sub-contracts requiring dedicated water supply, solid waste and sewage disposal arrangements at workers' camps to maintain sanitary conditions in the area.

109. At the construction sites, there is a potential for dust emission at the batching plant and material storage areas. Conditions requiring the contractor to suppress any dust hazards by the use of water spraying of roads and areas prone to dust emission. Hauling vehicles should be required to provide cover for materials. These requirements will be included in the contracts with contractors.

110. The construction sites and any temporary camp areas will be cleaned of all debris and properly restored on completion of construction when building contractors abandon the site.

C. Impacts of Loss of Water to the River System

1. Human Impacts

111. Upstream of the project, water is taken from the river for human usage. However, there are no households living downstream of the bridge on the A Lung river. There will be no impacts on any human activities in the stretch of water between the dam and powerhouse. Similarly, below the hydropower station there are no immediate human activities or water usage.

112. Impact to human activities is expected upstream of the dam where some houses and ricelands can be found near the bridge area. This area will be affected once the dam is constructed and the reservoir is filled up. Flooding in nearby areas may also be expected when water in the reservoir overflows during heavy rainfall events.

2. Fish Impacts

113. If all the water is taken from the A Lung river during the dry season, there is likely to be impacts on fish and aquatic life. With construction of the dam, any movement of fish upstream will be impossible; the river upstream of the dam is about 6 km in length and there are, however, unlikely to be any substantial areas for fish spawning upstream of the dam in the river or its side streams.

114. There are other small- and medium-sized projects identified by CPC and in the Regional Power Plan. If a number of these projects are constructed and no

consideration is given to providing adequate all year round water flows for fish movements, there is likely to be accumulated environmental impacts and reduced overall fish populations. The A Luoi Dam approximately 40 km downstream of A Roang is currently under construction – it is a large dam structure generating 175 MW. There are other planned power stations downstream also.

D. Specific Mitigation Measures

1. Compensation and Resettlement

115. CPC allocated 7.336 billion VND to cover the various elements of compensation and resettlement as covered in the RP. In addition, direct payments for roads and irrigation facilities that will be replaced, a new cemetery and open space area have been allocated to the community.

Table 10: Area Permanently Affected by Type of Use

| No. | Land Use | Area (ha) | % | Mitigation |
|------------|-----------------------|------------------|----------|--|
| 1 | Residential area | 0.50 | 0.7 | Compensation as per RP |
| 2 | Agriculture | 17.36 | 25.4 | Compensation as per RP |
| 3 | Aquaculture | 0.20 | 0.3 | Compensation as per RP |
| 4 | Production Forest | 32.93 | 48.2 | Compensation as per RP |
| 5 | Roads and transport | 0.12 | 0.2 | Replacement facilities to be provided |
| 6 | Irrigation facilities | 0.06 | 0.1 | Replacement facilities to be provided |
| 7 | Rivers and springs | 16.75 | 24.5 | None |
| 8 | Cemetery | 0.34 | 0.5 | A new cemetery has been allocated for the commune |
| 9 | Open area | 0.08 | 0.1 | Replacement area has been allocated to the community |
| 10 | Total | 68.34 | 100.00 | NA |

Source: Project Due Diligence Report, December 2010

2. River Water Flow

116. If the project is implemented, all the water in the river will be used for power generation, from February to August. There will be extended periods when there will be no water in the 1.3km section of the river system between dam and powerhouse. While there will be no impacts on human activities at this section and further downstream, there will be impacts on aquatic life in the river.

117. With lack of data, it is impossible to accurately define the quantitative impacts with respect to the ecology and habitat loss. The impacts may be significant in the no water scenario, where a section of the river is totally deprived of flow for a large part of the year.

118. Various methods have been used to assess minimum environmental flows in river situations where flows have been or will be regulated and water is denied to down stream uses. Simple hydrological and hydraulic methods have been employed where the level is set as a percentage of natural flow and takes into account river

morphology and water levels. More sophisticated methods rely on habitat simulation and the incorporation of the needs of river ecosystem components and the flow needs of other water users. Where data is available, it is possible to develop hybrid models to estimate environmental impacts and determine an acceptable minimum flow, which should be retained in the river system.

119. In the absence of any specific Vietnamese guideline for the amount of water to be retained in a watercourse when water is extracted for hydropower purposes, it is recommended that some flow be retained i.e. 10% of the lowest monthly average flow and a guaranteed flow of 100 litres/s is retained in the river.

120. Metal grills or screens will be provided at the weir intake. These screens have 2cm gaps and will prevent larger fish from passing downstream into the power water delivery system to the powerhouse.

3. Compensation for Loss of Trees and Forest Land

121. After discussion with A Luoi DPC on 26 December 2009 about the proposed replanting program, it was determined that there is no land in the District for tree replanting. In addition, forest land that will be lost is production forest and mainly tree lost by the project are bush and low value wood. These trees were compensated by CPC with an estimated cost of about 2,625,000,000 VND.

Table 11: Cost for compensation of tree and forest land

| No | Item | Cost (vnd) |
|-----------|---|----------------------|
| 1 | Compensation and Support for forest land (about 32ha) | 1,800,000,000 |
| 2 | Compensation and Support for tree | 825,000,000 |
| Total | | 2,625,000,000 |

V. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN AND INSTITUTIONAL REQUIREMENTS

122. CPC will be responsible for ensuring that conditions are included in the project construction contract documents. It will also ensure that during the construction phase, environmental mitigation measures, as per the EMP, are effective and are implemented. The EMP implementation will be coordinated with relevant Government Agencies such as Water Resources and Environment Departments at District level. This will include activities in the implementation of environmental monitoring programmes.

123. The CPC uses its Central Rural Electricity Project Management Board (CREB) to manage projects in rural areas. This Board has a staff of 88 and will be responsible for the implementation of ADB projects. It has experience in undertaking World Bank-funded projects also but its engineering and support staff have no specific capacity or qualified personnel in the fields of social, environment and resettlement. CPC will be responsible for three more hydropower subprojects under the C1 component of the ADB Loan 2517 sector project and will need to expand its capacity. To handle its general environmental management responsibilities, CPC and CREB will develop the necessary capacity and allocate manpower to specifically implement the A Roang environmental management plan and monitoring programme.

124. CPC will create an Environmental and Social Development Cell (ESDC). The cell will consist of two members to cover environment, social and resettlement issues. The ESDC will work in close cooperation with the respective field-based office on the day-to-day activities of EMP and the Resettlement Plan implementation. ToR for the environmental specialist is attached in Annex 3.

125. As CPC does not yet have the expertise and full capacity required for implementing the IEE and Resettlement Plan, it will have to depend on additional external technical assistance and will, therefore, hire a part-time Environmental Implementation Consultant who will be directly hired by CPC, to provide technical assistance in the implementation of the environment program and the EMP.

126. The Environmental Implementation Consultant will carry out internal on-the-job training and institutional capacity building for the Environmental and Resettlement Development Cell, thus supporting CPC expertise to implement the EMP and resettlement plans by itself in the future. The cost for the environmental management and monitoring is shown in Table 10.

Table 12: Estimated Budget for Environment Management and Monitoring

| Item No. | Description | Unit | Estimated Amount | |
|----------|---|------|------------------|--------|
| | | | VND | US \$ |
| 1 | Environment Specialist | Year | 195,000,000 | 10,000 |
| 2 | Environmental Monitoring & Evaluation | Year | 250,000,000 | 12,820 |
| 3 | Environment Implementation Consultant (part time) | Year | 195,000,000 | 10,000 |

| Item No. | Description | Unit | Estimated Amount | |
|----------|--|------|--------------------|---------------|
| | | | VND | US \$ |
| 4 | Training, Information Capacity building for CPC/ESDC | Once | 58,500,000 | 3,000 |
| | Total | | 698,500,000 | 35,820 |

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

127. CPC organized two public consultation meetings. The first one was held in March 11, 2010 to inform the stakeholders about the general clearance plan of A Roang hydropower project. The second public consultation was held on January 7, 2011 to disclose information about the social, environmental and resettlement issues of the proposed project.

A. Public Consultation Meeting on March 11, 2010 – People’s Committee of A Roang commune

1. Objectives of the Meeting

- To inform the stakeholders about the general clearance plan
- To receive comments from beneficiaries and affected peoples, local officials, community leaders, societies, and other stakeholders.

2. Disclosed information

- Subproject’s location, design and cost estimates
- GOV & ADB policies & procedures about: Resettlement & Compensation, Environment and Social issues
- Potential impacts caused by subproject.

3. Participants

128. About 30 - 50 participants attended the meeting, which included:
- CPC/CREBs representatives
 - Board of compensation and resettlement assistance
 - Local authorities: representatives of district and commune PCs.
 - Representatives of project affected people (PAP) to ensure they are meaningfully involved in the public consultation.

4. General Comments from Participants of subproject’s Public Consultation Meeting

129. The comments from the participants can be summarized as follows:

- There is agreement on the construction of A Roang hydropower subproject because this project will connect to the national power network and improve the quality of power supply to the local people of A Luoi District.
- The affected people hope that the resettlement or compensation rate is higher than in the previous projects.
- There was agreement on the general clearance plan of A Roang project.
- The project needs to ensure implementation of mitigation measures for negative impacts on the environment caused by this subproject.
- The stakeholders should be widely informed about the construction schedule beforehand so that they can plan for agricultural production and cultivation in the event of acquisition of their agricultural land.

5. Conclusion

130. There is agreement on the construction of the A Roang hydropower subproject. The stakeholders desire its immediate construction and implementation.



Photo 1. Pictures of the Public Consultation held on 11 March 2010 at the A Roang Commune

B. Public Consultation Meeting on January 7, 2011 at the People's Committee at A Roang Commune

1. Objectives of the Workshop

- To inform the stakeholders about the Project
- To receive comments from beneficiaries and affected peoples, local officials, community leaders, societies, and others
- Ensure community consensus for project implementation

- To disclose more detailed project information to local people based on the results of the studies conducted by CPC.

2. Disclosed information

- Subproject's objectives
- Subproject's location, design and cost estimates
- GOV & ADB policies & procedures
- Potential impacts caused by subproject
- Proposed mitigation measures
- Environmental Management Plan & Environmental Monitoring Program.

3. Participants

131. About 20 – 30 participants attended the meeting. They are composed of:
- CPC/CREBs representatives, CPC's Consultants
 - Provincial Agencies: representatives of DARD and DONRE
 - Local authorities: representatives of district and commune PCs, representatives of District/Commune Woman Union, Public Health, Environment Division at District and Commune level, representatives of local communities.
 - Representatives of project affected people (PAP) to ensure they are meaningfully involved in the public consultation. PAPs representatives included affected people as a result of anticipated direct and indirect environmental impacts. The PAPs who attended the meeting comprised of about 20 – 35% of the total PAPs.

4. Meeting Agenda

132. Table 11 presents the meeting agenda for the January 7, 2011 public consultation meeting.

Table 13: Meeting Agenda –January 7, 2011

| Duration of presentation (minutes) | Content | Presented by |
|------------------------------------|---|--|
| 5 | Welcome | PAP |
| 10 | Introduction of ADB's Project & A Roang subproject | |
| 30 | Brief presentations on the subprojects/ADB safeguard policy | Nguyen Thi Thanh Tra-Env Social Consultant |
| 60 | Discussion on potential impacts & mitigation measures & monitoring of mitigation measure implementation | All participants |
| 5 | Wrap-up & Closing | CPC/CREB |

5. General Comments from Participants of subproject's Public Consultation Meeting

133. The comments from the participants can be summarized as follows:
- There is agreement on the construction of A Roang hydropower subproject because this project will connect to the national power network and improve the quality of power supply to the local people of A Luoi District.

- Land compensation rates are relatively low but the rates for other assets are suitable.
- Before the consultation meeting, the people were not provided sufficient information about this project, especially about resettlement and compensation policy. The people requested for adequate information about resettlement & compensation policy to affected households for their agricultural land.
- The people welcomed the proposed A Roang hydropower project as it will bring high economic benefit and it will not affect significantly the environment or cause environmental pollution during operation period.
- The people agree on the results of the assessment of positive and negative impacts caused by this subproject as well as on the proposed mitigation measures.

6. Conclusion

134. Consensus was achieved on the socio-environmental impacts and mitigation measures recommended by the Project

135. Memoranda of the public consultation meeting at People's Committee of A Roang commune and public consultation meetings in the villages can be found at the Annex.



Photo 2. Participants during the public consultation held on January 7, 2011

C. Grievance Redress Mechanism

136. A grievance redress mechanism (GRM) will be established before project commencement. The Senior Site Person of the Power Company will be assigned as the point person who will be the first level, most accessible and immediate avenue for the fastest way to resolve grievances. Grievances will be resolved through continuous interactions with affected persons. The ESDC will answer queries and resolve grievances regarding various issues, which are the Company's responsibility. Corrective measures will be undertaken at the field-level within seven days. All grievances will be documented with full information of the aggrieved person and the issue and its resolution.

137. Complainants not satisfied with the response of the Company have the option of using the procedure available under the Civil Law and the Land Law 2003 (Article 138) and Decree 197/2004/ND-CP (Art. 63, 64) which specifies:

1. complaints will be sent to the commune People's Committee (PC), which must respond to a complainant within 15 days,
2. if the complainant is not satisfied with resolution of the commune PC, the next level of appeal is to the District PC which has the responsibility to respond and resolve complaints within 15 days,
3. If not satisfied with the resolution of the district PC, the complainant can bring the complaint to the provincial PPC,
4. As a final resort, if not satisfied with resolution of PPC, the complainant can take the case to the District Court.

VII. CONCLUSION, FINDINGS AND RECOMMENDATIONS

138. The IEE was conducted using the ADB screening matrix. There are no impacts on sites of historic or archaeological importance. The project is located immediately below the A Roang village on the main Ho Chi Minh Road. With the proposed project, there is anticipated loss of rice land and forest plantation trees at the head of the reservoir. There is no use of water for human activity on the downstream section of the river potentially deprived of water.

139. Apart from the loss of land in A Roang villages, the main impact identified in this initial environmental examination is the impact of the construction phase of the project and of the changed water conditions below the dam. Water will be removed or the river will experience very much reduced flows along the 1.3 km stretch of the A Lung River for more than half of the year. Immediately downstream of the hydropower plant, water will be discharged for a few hours daily during the dry season. The A Roang area has been defined by WWF as an area which is rich in species, some of which are classified as threatened. If the scheme is implemented with full use of the river water flow in the dry season, there would be significant impact on aquatic life. It is proposed to retain a minimum environmental flow in the river of 100 l/sec. Further monitoring and studies of river flows and downstream ecology will be conducted by CPC to gauge the impact of the environmental flow to the flora and fauna at the downstream areas so that appropriate modifications in operational flow can be implemented by the project. It is not possible to fully gauge the environmental impacts on aquatic life without continued studies to determine species tolerance to changes in river flow characteristics. Further recommendations on appropriate mitigation measures can be determined.

140. The other environmental consideration is to mitigate the impacts of construction activities particularly with the need to build 3.4 km of roads. With the proposed mitigation and environmental management plan, environmental impacts will be limited.

141. It is important, also, that CPC as the EA, develops its internal capacity to implement and monitor the measures in the EMP. This has been designed into the project by requiring the setting up of an Environmental Monitoring Unit in CPC and the appointment of environmental & resettlement specialists.

Table 14: Environmental Management Plan

| Environmental Aspect & Potential Impact | Remedial Measure | Means of Implementation | Institutional Responsibility | |
|--|--|--|--|---------------------------|
| | | | Implementation | Supervision |
| Design /Pre-construction Components | | | | |
| Project construction & potential loss of agricultural, forestry & grazing land | <ul style="list-style-type: none">- Design for maximize use of waste cut and fill materials.- Reservoir design and alignment of tunnel, penstock, power house and tail race to avoid existing land uses wherever possible- Compensation at market rates, prior to work commencement. | Proper planning Measures to be added in relevant parts of contracts. Proper resettlement planning. | Design consultants & CPC. | CPC |
| Excavation of construction materials and development of quarries & borrow areas causing loss of alternative land use | <ul style="list-style-type: none">- Use of existing permitted quarry & borrow areas already in operation.- Degraded, barren, riverbeds & waste lands with permits from the Government to be used for borrow materials. | Proper planning and measures to be added in the relevant parts of contract documents. | Design consultants & CPC. | CPC |
| Reduced water flows and reduction in water quality in the existing river course. | <ul style="list-style-type: none">- Ensure that dam construction is phased to ensure diversion of the river with coffer dams during separate construction of left & right abutments & ensure construction activities avoid soil & construction materials entering river flow.- Ensure a minimum flow is retained in the river | Planning & add measure to relevant parts of contract documents. | Design consultants & design engineers. | CPC |
| Water diverted from the river resulting to reduced water flow which could impact aquatic life. | <ul style="list-style-type: none">- Design to keep residual water flow in river to meet aquatic needs. | Design weir & intake facilities to allow residual flow to the river | Design consultants | |
| Construction stage | | | | |
| Earthworks for new access roads and construction of penstock on steep slopes leading to erosion & encroachment | Slopes along access roads & penstock will be provided with: <ul style="list-style-type: none">- Catchments/ cut-off drains, silt traps & chutes to minimize soil erosion.- Masonry retaining structures.- Formation of sediment basins & slope drains.- Maximum usage of material in fill areas.- Spoils planning particularly on steep slopes with bench terracing for high cut areas & avoidance of any erosion and runoff of material on down slopes- Planting grass and revegetation on disturbed areas and maintaining of landscaping. | Careful monitoring. | Contractor's Environment Engineer | SC, CPC reports to DONRE, |
| Use of Borrow Materials with potential for loss and degradation of land | <ul style="list-style-type: none">- No earth will be borrowed from cultivable and arable lands.- Borrowing to take place from barren, wastelands, & riverbeds.- For new borrow areas, all measures will be taken to avoid loss of any productive soil.- Any borrow areas will be refilled, re-vegetated & landscaped. | Conditions included in contracts. Careful monitoring | Contractor's Environment Engineer | SC, CPC reports to DONRE, |
| Taking of Quarry Materials with loss and degradation of land | <ul style="list-style-type: none">- Quarry materials will be obtained from existing operating sites with proper licenses & environmental clearances.- New quarries to be opened only with permission of respective authorities. | Careful monitoring | Contractor's Environment Engineer | SC, CPC reports to DONRE, |
| Operation of construction equipment and construction | <ul style="list-style-type: none">- Fuel storage & refuelling will have adequate containment, away from water bodies/channel. Equipment will be properly maintained. | Careful monitoring of conditions included in | Contractor's Environment | SC, CPC reports to |

| Environmental Aspect & Potential Impact | Remedial Measure | Means of Implementation | Institutional Responsibility | |
|--|---|---|---|--------------------------|
| | | | Implementation | Supervision |
| activities and contamination of soils, loss of water quality & water pollution | <ul style="list-style-type: none"> - Precautions to be taken to prevent water pollution due to increased siltation & turbidity for weir site & road construction particularly in dry month when flows are low. - Approved sites defined for storage & disposal of wastes materials - Any waste petroleum products will be collected, stored, & disposed of at approved sites. | contracts | Engineer and CPC | DONRE, |
| Construction activities causing disruption of existing surface drains. | <ul style="list-style-type: none"> - Appropriate rain-storm-water channels will be constructed. - Provision for cross drainage structures will be made. | Proper planning and measures to be added in the relevant parts of contract documents. Careful monitoring of site conditions | Design consultants & CPC. Contractor's Environment Engineer | CPC |
| Construction Camp & Residential colony. Social impacts & pollution from wastewater & solid waste | <ul style="list-style-type: none"> - Construction camps will be located adjoining the dam and powerhouse sites & away from any settlement. Manual labour will be employed locally. - Camps & residential colony will have properly designed sewage treatment system for wastewater effluent. Likewise, solid waste collection system will be employed. | Careful monitoring of site conditions and implementation of contract conditions. | Contractor's Environment Engineer | SC, CPC reports to DONRE |
| Emission from Construction Vehicles & Equipment causing air pollution | <ul style="list-style-type: none"> - Emission levels of all construction vehicles & equipment will conform to Vietnamese emission standards. - Pollutant parameters will be monitored during construction. - Crushing, & concrete plants will be away from population centres at dam and powerhouse sites. | Careful monitoring | Contractor's Environment Engineer | SC, CPC reports to DONRE |
| Dust particulates causing health impacts for workers and villagers | <ul style="list-style-type: none"> - All precautions to be taken to reduce dust level emissions from batching plants & portable crushers at dam and powerhouse sites. - Regular water spraying at all mixing sites & temporary service roads will be undertaken. - All delivery vehicles will be covered with tarpaulin. | Careful monitoring | Contractor's Environment Engineer | SC, CPC reports to DONRE |
| Construction activity Noise from Vehicles, Plant & Equipment causing noise pollution | <ul style="list-style-type: none"> - All construction equipment & plants will conform to Vietnamese noise standards. - All vehicles & equipment to be fitted with noise abatement devices. - Construction workers will be provided with personal protection. | Careful monitoring | Contractor's Environment Engineer | SC, CPC reports to DONRE |
| Noise pollution from any blasting activities at dam and power tunnel and penstock, | <ul style="list-style-type: none"> - Any blasting works will be in accordance with Vietnamese Explosives Act. - No blasting between dusk & dawn. - Residents close by will be informed well in advance of blasting times. - Workers associated with blasting sites will be provided with earplugs, helmets & other personal safety devices. | Careful planning & monitoring | Contractor's Environment Engineer | SC, CPC reports to DONRE |
| Construction of dam, reservoir, tunnel, penstock with loss of vegetation & tree cover. | <ul style="list-style-type: none"> - No trees to be removed without prior approval, - Compensation for lost trees on private land, - Planting grass and maintaining - Tree plantation implemented at dam area, tunnel, penstock, temporary construction areas, roads and other elements of the project. Indigenous tree species being accorded priority over exotic species such as: Acacia Aurculiformis A.Cunn.ex Benth | Careful monitoring of measures to be implemented using contractor. | Contractor's Environment Engineer | SC, CPC reports to DONRE |

| Environmental Aspect & Potential Impact | Remedial Measure | Means of Implementation | Institutional Responsibility | |
|---|--|--|-----------------------------------|--------------------------|
| | | | Implementation | Supervision |
| Work force during construction causing impacts to wildlife | - Construction workers to be educated for wildlife conservation with no hunting & poaching to be allowed for workers. | Contractor to enforce measures included in contract | Contractor's Environment Engineer | SC, CPC reports to DONRE |
| Construction Activities & Accident Risks | <ul style="list-style-type: none"> - All blasting sites will have warning & clearance signals. Site will be inspected prior/after blasting. - Workers will be provided with helmets, masks, safety goggles, etc. - A readily available first aid unit will be available with dressing materials etc. - Road safety education will be given to construction vehicle drivers. - Traffic management will be ensured during road construction periods. - Information dissemination will take place through the Commune's People Committee regarding activities causing disruption. | Inclusion of measures in contracts and follow up monitoring | Contractor's Environment Engineer | SC, CPC, EPA |
| Construction Activities causing disruption to Public Utilities | - Any public utilities likely to be impacted, such as water supply pipe system, power/phone lines etc. must be relocated to suitable places, in consultation with local beneficiaries. | To be added in the relevant parts of contract documents. | Design consultants & CPC. | CPC |
| Any discovery of artifacts or articles of historical interest and importance | - For all finds of an historical or cultural value, work will be stopped and the find reported to the nearest office of the Department Culture, Sport and Tourism or the Department of Culture and Information | To be added in the relevant parts of contract documents. | Contractor's Environment Engineer | CPC |
| Operational Stage | | | | |
| Reduced water flow in river effecting aquatic life | <ul style="list-style-type: none"> - Provide guaranteed minimum dry season flow of water in the river - Regular monitoring of the quantity of daily water flows below the weir intake. - Conduct further studies and monitoring of downstream ecology. | Measurements Undertaken by CPC hydrology engineers and consultants | CPC Environment Engineer | CPC |
| Possible loss of aquatic resources | - Support village aquaculture program. | CPC to monitor & coordinate with the local village heads | CPC Environment Engineer | CPC |
| Erosion in river bed from tail race discharge | - Provide stilling basin at the tailrace to prevent erosion and scouring | CPC to monitor & undertake necessary action | CPC Environment Engineer | CPC reports to DONRE |
| Soil erosion, land degradation & vegetation loss particularly on steep slopes | - Maintenance of vegetative cover over initial five year of project around the dam, tunnel, penstock, access road and at other project infrastructure. | Using sub-contractor or Government agency. | CPC Environment Engineer | CPC |
| Waste materials at the powerhouse | <ul style="list-style-type: none"> - Collection of waste oil - Segregation of office wastes while old and surplus equipment will be disposed through recycling centres or landfills. - Area will be kept clean and sanitary at all times. | CPC to monitor & undertake necessary action | CPC Environment Engineer | CPC reports to DONRE |

Table 15: Environmental Monitoring Plan

| Aspects/Parameters to be Monitored and Applicable Standard | Location | Means of Monitoring | Schedule/Frequency | Responsible to Undertake Monitoring | Estimated Cost (VND) |
|---|--|---|--|--|----------------------|
| Pre-construction | | | | | |
| 1. Completion of detailed design in accordance with EMP requirements | CPC in Da Nang | Review of detailed design documentation | Prior to approval of detailed design | CPC/CREB | 50,000,000 |
| 2. Implementation of all mitigation measures specified in IEE Table 14 on the following: | CPC in Da Nang | Review of detailed design documentation | | | |
| a. Proper resettlement planning. | | Review of RP/Due diligence report | Prior to start of site works | CPC/CREB/CMB | 60,480,251 |
| b. Siting of quarry and borrow areas consistent with EMP | Location of borrow area | Check contractor's construction materials plans, site visit | Prior to establishment of quarry and borrow areas | CPC/CREB | 15,000,000 |
| c. Environmental flow/residual flow | Downstream of dam | Review of detailed design documentation | Prior to start of site works | CPC/CREB | 8,840,000 |
| Construction stage | | | | | |
| <ul style="list-style-type: none"> Implementation of construction phase: environmental mitigation measures specified in IEE Table 14 | Locations indicated in IEE Table 14 for specific mitigation measures | Site visit, interviews with local residents, coordination with concerned agencies | Quarterly (on a regular basis) Random checks and to validate complaints | Social-Environmental Unit (ESDC)/A Roang commune monitoring board (CMB)/External monitoring Consultant (EMC) | 100,000,000 |
| <ul style="list-style-type: none"> Noise in dB(A) compared to standards specified in TCVN5949-1998 Dust in mg/l compared to standard specified in QCVN 05 : 2009/BTNMT 142. | Residential area in A Roang commune | Noise measurement | Quarterly (on a regular basis) Random checks and to validate complaints | Contractor/EMC | 50,000,000 |

| Aspects/Parameters to be Monitored and Applicable Standard | Location | Means of Monitoring | Schedule/Frequency | Responsible to Undertake Monitoring | Estimated Cost (VND) |
|---|---|--|--|-------------------------------------|-----------------------------|
| <ul style="list-style-type: none"> Surface water quality (fecal coliform, dissolved oxygen, pH, TSP, oil and grease, BOD5) in QCVN08: 2008:BTNMT Other parameters to be sampled, as appropriate to validate complaints and pollution event(s) due to project activities | Upstream, downstream of dam, Downstream of Hydropower plant | Field sampling | Quarterly (on a regular basis) Random checks and to validate complaints | Contractor/EMC | 22,800,000 |
| Operation Stage | | | | | |
| Reduced water flow/Minimum flow (m ³ /s) | Downstream of dam | Measurement of Discharge | Quarterly (on a regular basis) in the first year Random checks and to validate complaints | Project Owner | 35,358,000 |
| Soil erosion, land degradation & vegetation loss particularly on steep slopes | Around the dam, tunnel, penstock, access road and at other project infrastructure | Area revegetated, planted and maintained | Semi-annually (on a regular basis) | Project Owner | Included in management cost |

Note: Preconstruction costs will be taken from CPC budget

Annexes

Annex 1: Rapid Environmental Assessment (REA) Checklist

Annex 2: Terms of Reference for ESDC Staff

Annex 3: Photos of A Roang Hydropower Project Site

Annex 4: Memorandum of the public consultation meeting on March 11, 2010

Annex 5: Memorandum of the public consultation meeting on January 7, 2011

Annex 6: Approval of the Commitment on Environmental Protection

HYDROPOWER

Annex 1: Rapid Environmental Assessment (REA) Checklist

Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: Loan 2517-VIE: Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Project

Sector Division: Energy

A. Basic Project Design Data

1. Dam height, m = 13
2. Surface area of reservoir, (ha) = 8.28
3. Estimated number of people to be displaced = 0
4. Rated power output, (MW) = 7.2

Other Considerations:

1. Water storage type: ☒ reservoir ☐ run of river ☐ pumped storage
2. River diversion scheme: ☐ trans-basin diversion ☐ in-stream flow regulation
☒ in-stream diversion
3. Type of power demand to address: ☐ peak load ☐ base load

| SCREENING QUESTIONS | Yes | No | REMARKS |
|--|-----|----|---------|
| B. Project Location | | | |
| Is the dam and/or project facilities adjacent to or within any of the following areas? | | | |

| SCREENING QUESTIONS | Y e s | No | REMARKS |
|--|-------------|----|--|
| <ul style="list-style-type: none"> Unregulated river | x | | The A Lung River is a small stream. Water retention in the A Roang dam is a maximum of 104,000 m ³ . A minimum environmental flow of 100l/s will be discharged on a daily basis in the dry season. Additional flows of 45 l/s from two small streams at the left and right bank of A Lung River will augment river flows in the section between the dam and the powerhouse. |
| <ul style="list-style-type: none"> Unique or aesthetically valuable land or water form | | x | No. |
| <ul style="list-style-type: none"> Special area for protecting biodiversity | | x | The nearest conservation area to the project site is the Sao La Nature Reserve. The nature reserve is located about 5 km from the project area. |
| <ul style="list-style-type: none"> Protected Area | | x | The Sao La Nature Reserve is the nearest protected area from the site. |
| <ul style="list-style-type: none"> Buffer zone of protected area | x | | The project is located in the buffer zone of the Sao La Nature Reserve. The site is classified by the Thua Thien Hue Forest Protection Department as a non-forest area. |
| <ul style="list-style-type: none"> Primary forest | | x | All the forest land in the area is secondary growth or plantation forest consisting of Acacia, shrubs, and bushes. |
| <ul style="list-style-type: none"> Range of endangered or threatened animals | | x | There are reported endangered or threatened species in the general area of A Roang commune, particularly, at the Sao La Nature Reserve. However, the project area itself is not considered as habitat of these species. |
| <ul style="list-style-type: none"> Area used by indigenous peoples | x | | The population in the area are almost all ethnic minority Ta Oi people. |
| <ul style="list-style-type: none"> Cultural heritage site | | x | There are no known archaeological, cultural or religious heritage site located within proximity of the project. |
| <ul style="list-style-type: none"> Wetland | | x | Not applicable |
| <ul style="list-style-type: none"> Mangrove | | x | Not applicable |
| <ul style="list-style-type: none"> Estuary | | x | Not applicable |
| C. Potential Environmental Impacts Will the Project cause. | | | |
| <ul style="list-style-type: none"> short-term construction impacts such as soil erosion, deterioration of water and air quality, noise and vibration from construction equipment? | x | | Temporary Impacts are expected to water quality during construction and for soil erosion in steep terrain. |
| <ul style="list-style-type: none"> disturbance of large areas due to material quarrying? | | x | Existing quarries will be used and there is only a small quantity of borrow materials required for construction. |

| SCREENING QUESTIONS | Y e s | No | REMARKS |
|---|-------------|----|--|
| <ul style="list-style-type: none"> disposal of large quantities of construction spoils? | | x | Some disposal of construction spoil is required at designated sites close to the dam and powerhouse. |
| <ul style="list-style-type: none"> clearing of large forested area for ancillary facilities and access road? | | x | Some forest will be destroyed but it is not primary forest, being either secondary growth or plantation forest |
| <ul style="list-style-type: none"> impounding of a long river stretch? | | x | Only a 1.2km length of the river is impounded by the reservoir. |
| <ul style="list-style-type: none"> dryness (less than 50% of dry season mean flow) over a long downstream river stretch? | x | | There will be reduced flow in the river over 1.3 km. There are no settlements in this section of the river. |
| <ul style="list-style-type: none"> construction of permanent access road near or through forests? | x | | 3.4 km of access roads are required to the dam and plant; forest is either secondary growth or plantation forest. |
| <ul style="list-style-type: none"> creation of barriers for migratory land animals | | x | Not applicable |
| <ul style="list-style-type: none"> loss of precious ecological values due to flooding of agricultural/forest areas, and wild lands and wildlife habitat; destruction of fish spawning/breeding and nursery grounds? | | x | The project is on the small A Lung river which has a length of less than 6 km above the dam site |
| <ul style="list-style-type: none"> deterioration of downstream water quality due to anoxic water from the reservoir and sediments due to soil erosion? | | x | The reservoir is small & there will be only temporary loss of water quality during the construction stage. |
| <ul style="list-style-type: none"> significant diversion of water from one basin to another? | | x | Not applicable |
| <ul style="list-style-type: none"> alternating dry and wet downstream conditions due to peaking operation of powerhouse? | x | | There will be peak operation use during the dry season months. Water release is relatively small - maximum of 4.9 m ³ /s. There will be minimum flow retained in the river and immediately below the dam there are numerous side streams which augment flows. |
| <ul style="list-style-type: none"> significant modification of annual flood cycle affecting downstream ecosystem, people's sustenance and livelihoods? | | x | Small water retention |
| <ul style="list-style-type: none"> loss or destruction of unique or aesthetically valuable land or water forms? | | x | Small dam in steep valley |
| <ul style="list-style-type: none"> proliferation of aquatic weeds in reservoir and downstream impairing dam discharge, irrigation systems, navigation & fisheries, & increasing water loss through transpiration? | | x | Small retention area only |
| <ul style="list-style-type: none"> scouring of riverbed below dam? | x | | Stilling basin at tailrace will be provided to prevent riverbed scouring. |
| <ul style="list-style-type: none"> downstream erosion of recipient river in trans-basin diversion? | | x | Not applicable |
| <ul style="list-style-type: none"> increased flooding risk of recipient river in trans-basin diversion? | | x | Not applicable |
| <ul style="list-style-type: none"> decreased groundwater recharge of downstream areas? | | x | Project is small |
| <ul style="list-style-type: none"> draining of downstream wetlands and riparian areas? | | x | Not applicable |
| <ul style="list-style-type: none"> decline or change in fisheries below the dam due to reduced peak flows and floods, submersion of river stretches and resultant destruction of fish breeding and nursery grounds, and water quality changes? | | x | Not applicable |
| <ul style="list-style-type: none"> loss of migratory fish species due to barrier imposed by the dam? | x | | The dam will form a barrier to fish movements but the river above the dam site is only about 1.2km and the stream is steep. |

| SCREENING QUESTIONS | Y e s | No | REMARKS |
|---|-------------|----|---|
| <ul style="list-style-type: none"> formation of sediment deposits at reservoir entrance, creating backwater effect and flooding and waterlogging upstream? | | x | The hydropower dam will be provided with a sediment pit and a letout hole for sediments. Sediment gates are opened during the three months of the wet season. Revegetation will be implemented to reduce soil runoff. |
| <ul style="list-style-type: none"> significant disruption of river sediment transport downstream due to trapping in reservoir? | | x | Sediment deposits will be flushed through the system in periods of high flow when the dam gates are opened |
| <ul style="list-style-type: none"> environmental risk due to potential toxicity of sediments trapped behind the dams? | | x | Not applicable |
| <ul style="list-style-type: none"> increased saltwater intrusion in estuary and low lands due to reduced river flows? | | x | Not applicable |
| <ul style="list-style-type: none"> significant induced seismicity due to large reservoir size and potential environmental hazard from catastrophic failure of the dam? | | x | Not applicable – small dam |
| <ul style="list-style-type: none"> cumulative effects due to its role as part of a cascade of dams/ reservoirs? | | x | There are two hydropower dams upstream – Tra Hy and Song Bung 2 while there are two dams downstream – Song Bung 4 and Song Bung 3A. These were considered in the feasibility study. |
| <ul style="list-style-type: none"> depletion of dissolved oxygen by large quantities of decaying plant material, fish mortality due to reduced dissolved oxygen content in water, algal blooms causing successive and temporary eutrophication, growth and proliferation of aquatic weeds? | | x | Not applicable – small reservoir and no retention of water for more than 24 hours. |
| <ul style="list-style-type: none"> risks and vulnerabilities related to occupational health & safety due to physical, chemical, biological, & radiological hazards during project construction & operation? | | x | Occupational health and safety procedures will be implemented by the contractor. CPC will monitor implementation of the contractor safety plan. |
| <ul style="list-style-type: none"> large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? | | x | Small dam and project |
| <ul style="list-style-type: none"> creation of community slums following construction of the hydropower plant and its facilities? | | x | Not applicable |
| <ul style="list-style-type: none"> social conflicts if workers from other regions or countries are hired? | | x | Small camp during construction 150 workers – camps away from village |
| <ul style="list-style-type: none"> uncontrolled human migration into the area, made possible by access roads and transmission lines? | | x | Not applicable – small scheme only |
| <ul style="list-style-type: none"> disproportionate impacts on the poor, women, children or other vulnerable groups? | | x | EMDP and DDR will be implemented. |
| <ul style="list-style-type: none"> community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards? | | x | Community health and safety plan will be implemented. |
| <ul style="list-style-type: none"> risks to community safety due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? | | x | Coordination with the community will be conducted by CPC. |

Annex 2: Terms of Reference for ESDC Staff

CPC/ ESDC Environment Engineer

Specific Job Description:

- Responsible on behalf of CPC for ensuring the implementation of the IEE and EMP.
- Assist CPC and the design/supervision consultants in the site-specific environmental issues to ensure the least damage and disturbance to the natural environment and social values of the local residents.
- Examine, evaluate and advise persons in adopting suitable, cost-effective, socio-cultural, socially sensitive, and sound engineering project design, where the local residents receive the least disturbance.
- Conduct a cross checking and vetting of design/specification, tender, and contract documents, making them suitably orientated towards the environmental and sound engineering needs for the successful site selection, construction, and post-completion operation and maintenance of the project in an environment friendly manner.
- Recommend revision of Environmental Management and Monitoring Plans to PMU so that the proposed mitigation measures are properly implemented in a cost effective manner.
- Ensure water testing on regular basis, note any changes and adopt suitable measures, accordingly and analyse results and make recommendations to CPC if there is deterioration in water quality.
- Supervise implementation of water quality testing and fish monitoring programmes.
- Provide information as necessary to external consultants.
- Ensure environmental conditions included in contracts are fulfilled by contractors.
- Establish regular contacts and on-going liaison with People's Committees and Government Departments, local/regional NGOs, local officials, and all other stakeholders connected with the project related environmental issues.
- Collect environment related ecological/social data/information, make computer data entries, carry out the analysis and apply the results.
- Liaison between CPC and the Government Agencies, particularly the Environmental Water Resources Department who must receive 6 monthly reports on compliance with the EMP.

Qualifications

The ESDC Environmental Engineer is required to at least, to hold a Bachelor's degree and five years work experience in road engineering or as an environmental engineer on construction projects.

Annex 3: Photos of A Roang Hydropower Project Site

| | |
|--|---|
|  |  |
| <p>Upstream of the bridge and the upstream extent of the reservoir</p> | <p>The main reservoir area</p> |
|  |  |
| <p>Dam site construction area with plantation trees</p> | <p>Dam site construction area – grazing land for buffalo and cows.</p> |
|  | |
| <p>View down stream to power house in the valley – secondary forest growth - no human activity or use of water</p> | |

Annex 4: Memorandum of the public consultation meeting on March 11,2010

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập – Tự do – Hạnh phúc

BIÊN BẢN HỌP DÂN

- Căn cứ Giấy mời số 50/GM-UBND ngày 8 tháng 3 năm 2010 của UBND huyện A Lưới về việc UBND huyện tổ chức buổi họp dân thông qua Phương án Giải phóng mặt bằng Thủy điện A Roàng do đồng chí Nguyễn Quốc Cường – Phó Chủ tịch huyện chủ trì.

- Căn cứ Quyết định số 149/QĐ-UBND ngày 2 tháng 2 năm 2010 của UBND huyện A Lưới về việc thành lập Hội đồng DBHT&TĐC Dự án Thủy điện A Roàng.

Hôm nay ngày 11 tháng 03 năm 2010, tại UBND xã A Roàng đã tổ chức cuộc họp dân thông qua Phương án giải phóng mặt bằng thủy điện A Roàng. Thành phần tham gia cuộc họp bao gồm:

- Đ/c Hồ Văn Rêm: Phó Chủ tịch HD DBHT&TĐC – Trưởng Phòng Tài chính Kế Hoạch huyện A Lưới thay mặt đồng chí Nguyễn Quốc Cường - Phó chủ tịch UBND huyện A Lưới chủ trì cuộc họp.

- Đ/c Nguyễn Nho Châu: Phó Chủ tịch HD DBHT&TĐC Dự án Thủy điện A Roàng – Phó Giám đốc Ban QLDANL nông thôn KV miền Trung.

- Đ/c Hoàng Hữu Thành: Thành viên HD DBHT&TĐC Dự án Thủy điện A Roàng – Trưởng phòng TCHC Ban QLDANL nông thôn KV miền Trung.

- Đ/c Nguyễn Thế Phước: Tổ viên HD DBHT&TĐC Dự án Thủy điện A Roàng – CV phòng Thủy điện Ban QLDANL nông thôn KV miền Trung.

- Đ/c Nguyễn Xuân Việt: Tổ viên HD DBHT&TĐC- CV Phòng TCKH huyện A Lưới.

- Đ/c Hồ A Lua: Phó Chủ tịch UBND xã A Roàng.

- Đ/c Hồ Văn Nờ: Cán bộ Địa chính xã A Roàng.

- Các Đ/c Trưởng thôn A Roàng 1, A Roàng 2, Ka Rón, A Ho.

- Các hộ bị ảnh hưởng tham gia đầy đủ (2 hộ vắng).

Nội dung cuộc họp như sau:

Phía bên HD BTHT&TĐC:

- Đ/c Hồ A Lua: Giới thiệu các thành viên trong cuộc họp và giới thiệu khai quát về nội dung họp ngày hôm nay. Phát biểu của Anh Hồ A Lua về Hồ sơ Giải thửa khi đo đạc đất đai dự án của vùng bị ảnh hưởng, người có ý kiến về cán bộ Trung tâm Kỹ Thuật Sở TN&MT tỉnh Thừa Thiên Huế trong quá trình đo, vẽ, xác định nguồn gốc đất và diện tích đất tại hiện trường thì không có đầy đủ chủ hộ tham gia lúc đó, nên kết quả đo đạc tôi nghĩ không chính xác hoàn toàn được, tôi đề nghị trong quá trình kiểm kê, đo đếm sắp đến Hội đồng ĐBHT&TĐC cùng người dân, cán bộ địa chính Xã xác định kỹ càng để tránh thiệt hại, nhầm lẫn sau này.

- Đ/c Hồ Văn Rêm: Phát biểu về qui hoạch diện tích dự án, các nghị định, thông tư, Quyết định của Nhà nước để áp dụng vào đền bù giải phóng mặt bằng, phổ biến kiến thức thêm cho người dân ảnh hưởng được hiểu và biết hơn tầm quan trọng khi xây dựng nhà máy Thủy điện A Roàng.

- Đ/c Nguyễn Nho Châu: Phát biểu về vai trò của Chủ đầu tư vào dự án, trình bày khái quát qui mô của dự án cũng như sự ảnh hưởng của dự án đến sự phát triển kinh tế, văn hóa, xã hội của xã A Roàng nói riêng và huyện A Lưới nói chung, yêu cầu đồng bào xã A Roàng tích cực hợp tác, giúp đỡ, tạo điều kiện thuận lợi cho cán bộ xây dựng thi công công trình được dễ dàng.

- Đ/c Nguyễn Thế Phước: Phát biểu khái quát về dự án, dự án Thủy điện là dự án đem lại hiệu quả kinh tế cao cũng như 1 dự án mà sau khi đi vào vận hành sẽ không làm ô nhiễm môi trường, ảnh hưởng đến vùng sinh thái xã A Roàng, bên cạnh đó nó còn đem lại sự phát triển kinh tế, văn hóa của vùng. Mô tả các vùng ảnh hưởng bởi dự án, diện tích xây dựng nhà máy, các vùng nơi bị ngập và bán ngập ở khu vực lòng hồ,..hướng dẫn người dân kê khai, thủ tục để tiến hành công tác kiểm kê, đo đếm.

- Đ/c Hồ Văn Nở: Phát biểu sẽ hợp tác và tạo điều kiện thuận lợi cho Chủ đầu tư và HD ĐBHT&TĐC thực hiện việc GPMB tốt nhất. Bên cạnh đó sẽ cung cấp thông tin trung thực về số liệu đất đai của người dân.

- Đ/c Nguyễn Xuân Viết: Phát tờ khai mẫu cho từng người dân, hướng dẫn người dân điền vào trong mẫu tờ khai đó.

Phía bên người dân ảnh hưởng:

Anh BLúp Thân:

- Trước hết xin cảm ơn Đảng và Nhà nước, các đồng chí đã quan tâm đến nhân dân, đồng bào vùng sâu, vùng xa chúng tôi, đã xây dựng nhà máy thủy điện tại xã chúng tôi;

- Hết sức vui mừng vì Đảng và Nhà nước đã đem ánh sáng đến người dân xã A Roàng.

- Ngày trước khi đền bù đường Hồ Chí Minh nhà tôi có mất 2 cây tiêu và đất lúa nhưng nhà nước đền bù ít quá. Nên đề nghị Hội đồng và chủ đầu tư đền bù lần này tốt hơn.

Anh Kăn Hàn (Quỳnh Hàn – Kề Điền Pray):

- Trước hết xin cảm ơn Đảng và Nhà nước đã quan tâm xây dựng hướng có lợi cho dân A Roàng chúng tôi rất cảm kích và phấn khởi vì điều đó. Khi nghe tin xây dựng Nhà máy Thủy điện A Roàng tại xã chúng tôi, chúng tôi rất vui mừng vì đem đến ánh sáng, văn minh và phát triển kinh tế cho xã chúng tôi. Vì là nhà máy Thủy điện nên khi hoạt động nhà máy không làm ô nhiễm môi trường sông cho vùng chúng tôi, chúng tôi rất phấn khích điều đó.

Anh BLúp Chụ:

- Cảm ơn Chính quyền, Chủ đầu tư công ty Điện lực 3 đã xây dựng dự án nhà máy đem lại văn minh, ánh sáng, văn hóa cho làng, xã chúng tôi. Chúng tôi rất phấn khởi chào đón các anh cán bộ dự án thi công, giải phóng mặt bằng đến Làng, xã chúng tôi.

- Khi làm đường Hồ chí minh nhà tôi có bị thiệt hại 1 số cây ăn quả, đất ruộng nhưng Nhà nước đền bù thấp quá. Nghe tin có dự án Nhà máy Thủy điện A Roàng xây dựng tại xã chúng tôi, chúng tôi hi vọng lần này giá cả đền bù tốt hơn và nhiều hơn lúc trước.

Các anh A Viết Trum, Quỳnh A Tê, Kăn A Pou, A Viết Kinh...đều có ý kiến ủng hộ việc xây dựng Nhà máy Thủy điện A Roàng và cho rằng xây dựng Nhà máy thủy điện A Roàng là 1 bước để thúc đẩy kinh tế, văn hóa cho đồng bào xã A Roàng.

Sau khi đại diện các bên có ý kiến. Nội dung cuộc họp được kết luận như sau:

- UBND xã cam kết sẽ hỗ trợ hết sức cho Hội đồng đền bù HT&TĐC dự án Thủy điện A Roàng thực hiện công việc GPMB được thuận lợi nhất.
- UBND xã A Roàng thống nhất các phương hướng và nhiệm vụ, các Quyết định, nghị định, thông tư để áp dụng trong việc GPMB của Hội đồng ĐBHT&TĐC huyện A Lưới đưa ra.
- Người dân hoàn toàn thống nhất theo đơn giá đền bù hiện hành do UBND tỉnh ban hành.
- Việc xây dựng dự án nhìn chung không ảnh hưởng xấu đến môi trường thậm chí còn góp phần cải tạo môi trường đem lại sự phát triển kinh tế, văn hóa, xã hội khu vực.
- Toàn dân bị ảnh hưởng đều nhất trí với Hồ sơ giải thửa do Trung tâm Kỹ Thuật Sở TN&MT thực hiện.
- Toàn dân thống nhất sau khi kiểm kê, đo đếm tài sản bị ảnh hưởng khi giải phóng mặt bằng thì áp dụng khung giá nhà nước qui định.

- Toàn dân bị ảnh hưởng đều thống nhất với Quyết định Phê duyệt Phương án bồi thường tổng thể dự án Thủy điện A Roàng số 1545/QĐ-UBND ngày 30 tháng 12 năm 2009 của UBND huyện A Lưới.
- Toàn dân phấn khởi và nhiệt liệt ủng hộ khi xây dựng Dự án nhà máy thủy điện A Roàng tại xã A Roàng.

Đúng vào lúc 11 giờ 45 phút cùng ngày đồng chí Hồ Văn Rêm, thay mặt Hội đồng ĐBHT&TĐC huyện A Lưới, người tuyên bố kết thúc cuộc họp thành công và tốt đẹp.

A Roàng, ngày 11 tháng 03 năm 2010.

ĐẠI DIỆN HỘI ĐỒNG BTHT&TĐC

ĐẠI DIỆN CHỦ ĐẦU TƯ

ĐẠI DIỆN UBND XÃ A ROÀNG

ĐẠI DIỆN CÁC THÔN TRƯỞNG

- 1.
- 2.

ĐẠI DIỆN NGƯỜI DÂN BỊ ẢNH HƯỞNG

- 1.
- 2.

Summary of Memorandum of the public consultation meeting on March 11,2010

Participants

- CPC/CREBs representatives
- Board of compensation and resettlement assistance
- Local authorities: representatives of district and commune PCs.
- Representatives of project affected people (PAP) to ensure they are meaningfully involved in the public consultation.

Summary of contents of the meeting

The comments from the Board of compensation and resettlement assistance can be summarized as follows:

- Introduction of the objectives of the meeting and participants
- Presentation of the basic information of A Roang hydropower project
- Presentation of the regulation of Vietnam on compensation, clearance
- Presentation of the assessment of project to the life of local people, the environment
- Presentation on GOV & ADB policies & procedures about: Resettlement & Compensation, Environment and Social issues
- Suggestions of the affected people in cooperation with the Project Owner and Board of compensation

The comments from the participants can be summarized as follows:

- There is agreement on the construction of A Roang hydropower subproject because this project will connect to the national power network and improve the quality of power supply to the local people of A Luoi District.
- The affected people hope that the resettlement or compensation rate is higher than in the previous projects.
- There was agreement on the general clearance plan of A Roang project.
- The project needs to ensure implementation of mitigation measures for negative impacts on the environment caused by this subproject.
- The stakeholders should be widely informed about the construction schedule beforehand so that they can plan for agricultural production and cultivation in the event of acquisition of their agricultural land.

Conclusion

There is agreement on the construction of the A Roang hydropower subproject. The stakeholders desire its immediate construction and implementation.

A Roang, 11 March 2010

DAI DIEN HOI DONG BTHT & TDC

DAI DIEN CHI DAU TY

DAI DIEN UBND XA A ROANG

DAI DIEN CAC THON TRUONG

DAI DIEN NGUOI DAN BI ANH HUONG

Annex 5: Memorandum of the public consultation meeting on January 7, 2011

Quốc gia xã hội Chủ nghĩa Việt Nam

Độc lập - Tự do - Hạnh phúc

BIÊN BẢN THAM VẤN

Hôm nay ngày 7 tháng 1 năm 2011, chúng tôi gồm:

Đại diện Ban vì Tài sản:

- 1- Ông Nguyễn Thị Thanh Lát - Trưởng nhóm
- 2- Ông Nguyễn Nhài Phong - Thành viên
- 3- Bà Đỗ Thu Hằng - Thành viên
- 4- Ông Nguyễn Hữu Tường - Thành viên
- 5- Bà Đỗ Thị Thu Hiền - Thành viên

Và đại diện chính quyền UBND xã A Rông, huyện A Lưới, tỉnh

Thừa Thiên Huế:

- 1 - Ông Bùi Xuân Diêu - Cán bộ văn phòng Tổng tài xã
- 2 - Ông Bùi Xuân Duyệt - Phó CT UBND xã
- 3 - Ông Hồ Văn Hộ - Cán bộ địa chính
- 4 - Chu A Vết Thu Nhu - CT hội phụ nữ xã

Thảo luận về một số vấn đề như sau:

- 1 - Thường tư vì kinh tế xã hội, đời sống của bà con trong xã A Rông
- 2 - Về đồng tích cực và tích cực Dự án có thể mang đến cho người dân xã A Rông
- 3 - Về sử dụng đất trong sản xuất của người dân hiện nay và sau khi có nhà máy Thủy điện
- 4 - Các thông tin về quá trình thực hiện, đến từ diện tích đất, tài sản trên đất bị ảnh hưởng bởi Dự án (thanh toán đất, quá trình bồi, quá trình kiểm soát, khiếu nại, các chương trình hỗ trợ ...)
- 5 - Các chính sách hỗ trợ từ Ngân hàng chính sách xã hội huyện A Lưới tại địa phương xã A Rông: Ngân hàng chính sách xã hội huyện A Lưới tại địa phương xã A Rông: Ngân hàng chính sách xã hội huyện A Lưới tại địa phương xã A Rông: Ngân hàng chính sách xã hội huyện A Lưới tại địa phương xã A Rông

xuống hồ trợ, hướng dẫn người dân các thủ tục vay vốn theo các chương trình hồ trợ của Ngân hàng (1 tháng 1 lần vào ngày mùng 3)

5 - Tái định cư: Cán bộ xã cho biết Dự án thủy điện A Roang sẽ không có hồ nào phải tái định cư.

Trong số các hộ gia đình bị mất sản xuất lúc thì có 10 hộ gia đình bị mất hoàn toàn đất sản xuất lúc.

6 - Giá đền bù

Giá đền bù áp dụng theo quy định của tỉnh thì giá đất xuống, đất trồng lúa ... hiện nay là thấp (đời với giá đất) vì so với hiện trạng giá đền bù cho cây cỏ, hoa màu đã hợp lý.

Tại địa phương chưa có chuyển nhượng quyền sử dụng đất.

7 - Khiếu nại

Hiện nay, đã chuyển 54 đơn khiếu nại về Hòt tổng đền bù và GPMB huyện. Các đơn khiếu nại chủ yếu về giá bồi thường đất.

8 - Tham vấn

Đã tiến hành tham vấn và dân các kết quả kiểm tra tại thôn. Phát cho các hộ bị ảnh hưởng quyết định 11/2010/QĐ-UBND và các tài liệu liên quan khác.

9 - Ảnh hưởng tạm thời

Giữa chủ đầu tư và người dân đã thỏa thuận về việc đền bù tạm thời và người dân không có ý kiến gì.

Cuộc họp kết thúc lúc 16 giờ ngày 7/1/2011

Đại diện đơn vị tư vấn

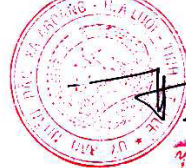
chị

Nguyễn Thị Thanh Trà

Nguyễn Như Phương

Nguyễn Như Phương

Đại diện UBND xã



mk

Văn Xuân Danh

Summary of Memorandum of the public consultation meeting on January 7, 2011

Participants

They are composed of:

- CPC/CREBs representatives, CPC's Consultants
- Provincial Agencies: representatives of DARD and DONRE
- Local authorities: representatives of district and commune PCs, representatives of District/Commune Woman Union, Public Health, Environment Division at District and Commune level, representatives of local communities.
- Representatives of project affected people (PAP) to ensure they are meaningfully involved in the public consultation. PAPs representatives included affected people as a result of anticipated direct and indirect environmental impacts. The PAPs who attended the meeting comprised of about 20 – 35% of the total PAPs.

Summary of contents of the meeting

The sides discuss about the contents follows as:

- The information of economy – social, the life of local people in A Roang Commune
- The positive and negative assessment of the project to the local people, the environment in A Roang Commune
- Use electricity for production of local people
- Information about the compensation, clearance, the affected land and poverties on land, complaints and assistance program
- No household affected by A Roang project has to be resettled
- The price of compensation for affected households
- Environmental Management Plan & Environmental Monitoring Program

Conclusion

Consensus was achieved on the socio-environmental impacts and mitigation measures recommended by the Project.

Participants

They are composed of:

- CPC/CREBs representatives, CPC's Consultants
- Representatives of project affected households (PAH) at A Roang 1, A Roang 2, Karon, A Ho hamlets to ensure they are meaningfully involved in the public consultation.

Summary of contents of the meeting

The following were discussed:

- The policy of compensation and resettlement of A Roang hydropower project
- The items related to the ethnic minority of A Roang hydropower project
- The agreement of the positive and negative impacts of the project to the local people, the environment in A Roang Commune.

Annex 7: Certificate of Registration of Environmental Protection Commitment for A Roang Hydropower Project

**ỦY BAN NHÂN DÂN
HUYỆN A LŨI**
Số 07/GXN - UBND

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc
A LŨI, ngày 24 tháng 6 năm 2010

GIẤY XÁC NHẬN ĐĂNG KÝ BẢN CAM KẾT BẢO VỆ MÔI TRƯỜNG Của Dự án nhà máy thủy điện A Roang

Căn cứ Luật Tổ chức Hội đồng Nhân dân và Ủy ban Nhân dân ngày 26 tháng 11 năm 2003;

Căn cứ Luật Bảo vệ môi trường ngày 29 tháng 11 năm 2005;

Căn cứ Nghị định số 80/2006/NĐ-CP ngày 09 tháng 8 năm 2006 của Chính phủ về việc Quy định chi tiết và hướng dẫn thi hành một số điều của Luật Bảo vệ môi trường;

Căn cứ Nghị định số 21/2008/NĐ-CP ngày 28 tháng 02 năm 2008 của Chính phủ về sửa đổi, bổ sung một số điều của Nghị định số 80/2006/NĐ-CP ngày 09 tháng 8 năm 2006 của Chính phủ về việc quy định chi tiết và hướng dẫn thi hành một số điều của Luật Bảo vệ môi trường;

Căn cứ Thông tư số 05/2008/TT-BTNMT ngày 08 tháng 12 năm 2008 của Bộ Tài nguyên và Môi trường hướng dẫn về đánh giá môi trường chiến lược, đánh giá tác động môi trường và cam kết bảo vệ môi trường;

Theo đề nghị của Trường Phòng Tài nguyên và Môi trường.

ỦY BAN NHÂN DÂN HUYỆN XÁC NHẬN:

Điều 1. Chủ dự án là Ban quản lý dự án năng lượng nông thôn khu vực miền Trung đã có công văn số 1145/DANT-TD ngày 7 tháng 4 năm 2010 về việc đề nghị xác nhận đăng ký bản cam kết bảo vệ môi trường dự án nhà máy thủy điện A Roang.

Điều 2. Chủ Dự án có trách nhiệm thực hiện đúng và đầy đủ những nội dung về bảo vệ môi trường nêu trong bản cam kết bảo vệ môi trường và những yêu cầu bắt buộc sau đây:

1. Phải lập, đăng ký và xác nhận bản cam kết bảo vệ môi trường bổ sung:

Khi dự án có một trong những thay đổi cơ bản về công nghệ hoặc quy mô, công suất hoặc địa điểm thực hiện; trường hợp việc thay đổi địa điểm của dự án xảy ra đồng thời với việc thay đổi cơ quan có thẩm quyền xác nhận, chủ dự án phải lập lại hồ sơ đăng ký bản cam kết bảo vệ môi trường;

2. Bản cam kết bảo vệ môi trường bổ sung phải được thể hiện theo đúng cấu trúc và đáp ứng yêu cầu về nội dung theo quy định tại Phụ lục 28 ban hành kèm theo Thông tư số 05/2008/TT-BTNMT ngày 08 tháng 12 năm 2008 của Bộ Tài nguyên và Môi trường hướng dẫn về đánh giá môi trường chiến lược, đánh giá tác động môi trường và cam kết bảo vệ môi trường.

3. Khi cần thiết sử dụng nước ngầm bằng giếng khoan phải chấp hành nghiêm Luật Tài nguyên nước số 08/1998/QH10 ngày 20 tháng 5 năm 1998; Quyết định số 84/2008/QĐ-UBND ngày 11 tháng 01 năm 2008 của Ủy ban Nhân dân tỉnh Thừa Thiên

Huế về việc ban hành Quy định về quản lý, sử dụng, bảo vệ tài nguyên nước và xả nước thải vào nguồn nước trên địa bàn tỉnh.

4. Bổ sung vào bản cam kết bảo vệ môi trường của dự án các nội dung theo quy định tại Thông tư số 05/ 2008/ TT-BTNMT ngày 08 tháng 12 năm 2008 của Bộ Tài nguyên và Môi trường hướng dẫn về đánh giá môi trường chiến lược, đánh giá tác động môi trường và cam kết bảo vệ môi trường.

Điều 3. Bản cam kết bảo vệ môi trường của Dự án và Giấy xác nhận này là cơ sở để các cơ quan quản lý nhà nước về bảo vệ môi trường giám sát, kiểm tra, thanh tra việc thực hiện bảo vệ môi trường trong suốt quá trình thi công xây dựng và vận hành dự án.

Điều 4. Giấy xác nhận này có hiệu lực kể từ ngày ký.

Nơi nhận:

- Chủ dự án;
- Chỉ cục BVMT tỉnh;
- Thường vụ Huyện ủy;
- TT. HĐND Huyện;
- CT và các PCT UBND Huyện;
- Phòng TN&MT Huyện;
- UBND xã Phú Vinh;
- VP: LD, CV, VT;
- Lưu VT, LT.

TM. ỦY BAN NHÂN DÂN
K. CHỦ TỊCH



PHÓ CHỦ TỊCH
Nguyễn Quốc Cường

**A Luoi District People's
Committee**

**Socialist Republic of Vietnam
Independence - Freedom - Happiness**

Ref No 07/GXN-UBND

A Luoi, 24/06/2010

CERTIFICATE

**of Registration of Environmental Protection Commitments
for A Roang Hydropower Project**

**A Luoi District People Committee
CERTIFIES**

Article 1: On 07 April 2010, the Project Owner, Central Rural Electricity Project Management Board, submitted Official Letter 1145/DANT-TD to register environmental protection commitments for A Roang hydropower project at A Roang commune, A Luoi District, Thua Thien Hue Province

Article 2: The Project Owner has responsibility to fully implement the content of the stated environmental protection commitment and requirements follows as:

1. Establish, register and certify the additional registration of Environmental Protection Commitments if this project has changes of basis data.
2. The additional Environmental Protection Commitments has to fully implement followed to Circular no.05/2008/TT-BTNMT on 08 Dec-2008 of MONRE providing guideline of evaluation of strategic environment, environmental assessment and environmental protection commitments.
3. If need to use the underground water, the Owner has to fully implement the Water Resource Law, Decision no.84/2008/QD-UBND on 11 Jan,2008 of Thua Thien Hue District People Committee providing regulations on management, using and protecting water resource and letting out waste water to water resource in Thua Thien Hue Province.
4. Addition into Environmental Protection Commitments the contents followed to Circular no.05/2008/TT-BTNMT.

Article 3: The environmental protection commitments of the Project and this certificate constitute the basis for environmental state management agencies to supervise, control and inspect the implementation of environmental protection content of the Project.

Article 4: This Certificate is effective from the date of issuance.

Recipients:

- Project Owner;
- District's Environmental Protection Department;
- District People Committee;
- DONRE;
- Archival:VT;

**On behalf of A Luoi District People Committee
Vice Chairman**

(signature and stamp)

Nguyen Quoc Cuong