

**MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
CENTRAL PROJECTS OFFICE (CPO)**

Vietnam Dam Rehabilitation and Safety Project (DRSIP)

**EXECUTIVE SUMMARY
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) OF THE FIRST YEAR
SUB-PROJECTS**

JULY, 2015

EXECUTIVE SUMMARIES OF THE ESIAs OF THE 12 PRIORITY DAMS

A. GENERAL SUMMARY

1. Twelve (12) priority dams have been identified for repairs and upgrading during the first year of the DRSIP implementation (Table 1). As part of the project preparation, full Environmental and Social Impact Assessments (ESIAs) have been conducted on these dams. The results of the ESIA were used to develop an Environmental and Social Management Framework (ESMF) which would govern the safeguards screening, assessment, review and approval of future dam repairs/upgrading under the project.

2. Seven (7) of the dams are located in the Central region, four (4) in the Northern region and one (1) in the Highland region. Incomes are generally low in these regions. All 12 dams are located near or within populated areas of the communes. Hence, there are generally no more pristine forest or natural habitat near these dams.

Table 1. Names, locations and key parameters of the 12 priority dams

Dam	District	Province	Region	Service area (ha)	Storage (million m ³)	Crest height (m)
1. Khe Gang	Quynh Luu	Nghe An	Central	175	2.15	12.5
2. Ngoi La 2	Yen Son	Tuyen Quang	Northern	360	3.24	15.0
3. Ho Ban	Cam Khe	Phu Tho	Northern	150	1.68	11.0
4. Dai Thang	Lac Thuy	Hoa Binh	Northern	90	0.84	14.5
5. Khe Che	Dong Trieu	Quang Ninh	Northern	213	12.00	12.5
6. Dong Be	Nhu Thanh	Thanh Hoa	Central	255	2.29	11.4
7. Khe San	Quynh Luu	Nghe An	Central	120	1.42	14.5
8. Phu Vinh	Dong Hoi	Quang Binh	Central	1,056	22.36	24.4
9. Dap Lang	Nghia Hanh	Quang Ngai	Central	100	0.38	13.1
10. Thach Ban	Phu Cat	Binh Dinh	Central	130	0.70	12.8
11. Song Quao	Ham Thuan Bac	Binh Thuan	Central	8,120	73.00	40.0
12. Da Teh	Da Huoi	Lam Dong	Highland	2,300	24.00	27.3

2. Nature of Repair or Upgrading Works. The repair and upgrading works of the dams mostly involve a combination of some of the following: additional embankment works for eroded portion of the dam; levelling or slightly elevating the crest height; fixing of leakages on the dam body and foundation; reinforcement of dam structure with concrete; repair, reinforcement and/or extension of the spillway structures; repair or replacement of intake structures with new construction; rehabilitation or construction of new service roads; repair or construction of new management house; repair or improvement of drainage on the downstream body of the dam; and installation of new lighting system. None of the proposed works have involved increasing the effective crest height of the spillway.

3. Environmental and Social Screening. All the 12 proposed repair and upgrading works (subprojects) have undergone Environmental and Social Screening. Results of the screening indicate that none of the proposed works would result in the increase of the surface area of the reservoir, or water holding capacity, from its original design. Also, none of the dams and reservoirs is situated in any critical natural habitat or situated in areas known to harbour any rare or endangered species. Of the total 12 sub-projects selected for the first year implementation, five have EM peoples present in the subproject area. One (1) of the proposed repair works will affect directly ethnic minorities (by stopping water supply during construction). All of the subprojects would require permanent and temporary land acquisition but only nine (9) will entail recovery of land from private households and

4 sub-projects (13 households) would require relocation of houses. Only four (4) of the dams are “large” dams, having height of 15 or more, or having reservoir capacity of more than 3.0 million cubic meters. The rest are small dams as per World Bank OP/BP 4.37. Only four (4) of the sub-projects fall within Environmental Category A under the World Bank OP/BP 4.01 categorization.

Table 2. Results of the Environmental and Social Screening

Sub-project	Will increase Reservoir Capacity?	Affect Critical Natural Habitat	Affected Ethnic Minorities	Cultural Property/ Site	Number of permanently affected households *	Dam Category	Environmental Category
1. Khe Gang	No	No	None	None	1 (0)	Small	B
2. Ngoi La 2	No	No	None	None	12 (1)	Large	A
3. Ho Ban	No	No	None	None	15 (0)	Small	B
4. Dai Thang	No	No	Yes	None	10 (1)	Small	B
5. Khe Che	No	No	None	None	0 (0)	Small	B
6. Dong Be	No	No	None	None	0 (0)	Small	B
7. Khe San	No	No	None	None	3 (1)	Small	B
8. Phu Vinh	No	No	None	None	24 (0)	Large	A
9. Dap Lang	No	No	None	None	18 (0)	Small	B
10. Thach Ban	No	No	None	None	2 (0)	Small	B
11. Song Quao	No	No	None	None	18 (10)	Large	A
12. Da The	No	No	None	None	0 (0)	Large	A

* Figure in parentheses indicates the number of households that would need to be relocated.

4. Environmental and Social Impacts. The repair and upgrading works would bring in benefits to the communities within the influence areas of the dam in terms of improving dam safety and providing a more reliable supply of irrigation and domestic water supply. Since the repair works would not increase current design capacities of the reservoir, the negative impacts of the subprojects would be limited to impacts commonly associated construction activities such as the following:

- Temporary increase in sedimentation of receiving water channels and increased turbidity of surface water
- Temporary change of flow pattern during construction period
- Increased nuisance from dust and noise
- Increased health and safety risks for the local residents due to exposure of hazards from construction activities, non-resident population and traffic
- Temporary migration of wildlife away from construction site
- Interruption in irrigation water supply
- Damage to existing infrastructure due to construction traffic especially the hauling of embankment materials
- Loss of crops, trees and other properties due to permanent and temporary land use by the subproject.

5. Long term negative impacts lasting beyond the construction period include: (1) possible land and soil degradation in the construction sites and vicinities due to excavation, compaction, litters, improper disposal of construction wastes and spoils. On the social aspect, long-term impacts would include loss of land (land use rights) of some households due to permanent land use by the sub-projects. Other long

term impacts would be mostly indirect resulting from increase in economic activities within the area. This may include intensification of agricultural activities due to availability of irrigation water, leading to increased use of pesticide.

6. Resettlement Action Plan: Social impacts of 12 first-year subprojects are not significant. It is estimated that total number of household affected by these subprojects is 985, in which, 103 households are affected permanently by land acquisition, 882 households are affected temporarily of which only 22 households are affected by land acquisition whereas the remainders (865 households) are affected by the temporary lack of water supply during the construction. Total acquired land is 421,889 m², of which, permanently acquired land area is 319,761 m², temporarily acquired land area is 102,128 m²

Of the total 12 first-year subprojects, only one Da Teh subproject would not require have land acquisition. Thus, no RAP is prepared for this subproject. The remaining 11 subproject have RAPs prepared, of which four are full RAPs, including Dai Thang, Dap Lang, Thach Ban and Song Quao. The remaining 7 RAPs are abbreviated RAPs. The total cost estimate of RAP implementation is 25,990,692,717 VND.

7. Ethnic minority

Of the total 12 sub-projects selected for the first year implementation, five have EM peoples present in the subproject area. EMDPs have been prepared for these five subprojects, including Dai Thang sub-project (Hoa Binh province), Khe Che sub-project (Quang Ninh province), Dong Be sub-project (Thanh Hoa province), Song Quao sub-project (Binh Thuan province), and Da Teh sub-project (Lam Dong province).

Of the five subprojects having EM present in the subproject area, only one subproject (Dai Thang) that may temporarily affect an estimated 223 ethnic minority households due to temporary water restriction that may take place during one cropping season. For this subproject, a RAP has been prepared to ensure the loss of cropping opportunities are appropriately and timely compensated for – as per Project's RPF (please see the RAP prepared for Dai Thang subproject for details). For the remaining four subprojects, no adverse impact are anticipated during subproject preparation and will be further updated once the detailed design of the subprojects are finalized during project implementation. The EMDP for these four subprojects were prepared on the basis of social assessment, and consultation with the EM peoples from these subprojects. These EMDPs aim to offer development opportunities for these EM peoples present in the subproject area. Indeed, these four subprojects, once completed, will enhance reservoir safety and improved water access for the EM peoples who use water from these reservoirs for their agricultural production.

8. Mitigation Measures and Instruments. Included in each ESIA reports are Environmental and Social Management Plans (ESMPs) which detail the mitigation measures to be adopted. Typical mitigation measures are summarized in Table 3. For subprojects involving land acquisition, a separate Resettlement Action Plan/Compensation Plan (RAP) had been prepared. For subprojects that affect ethnic minorities, a separate Ethnic Minority Development Plan (EMDP) had been developed through consultations with the affected communities. Other safeguards instruments have also been prepared such as Chance Find Procedures (CFP) and Grievance Redress Mechanisms (GRM).

9. Since most of the impacts are construction-related and contractors will be generally the ones in control of the construction site, contractors are required to prepare their own Contractor's Environmental and Occupational Health and Safety Plan (CEOHSP) which incorporates all construction-related measures in the ESMP and industry Health, Safety and Environment (HSE) standards and good practices, including good housekeeping at construction site, waste management, provision of adequate water and sanitation facilities, provision of safety corridors/passageways, installation of barrier fences around dangerous areas and wearing of PPEs. The CEOHSP will be reviewed and approved by the CPO before construction can commence in the site.

Table 3. Common Impacts, Typical Mitigation Measures and Instruments of Implementation

Common Impacts	Typical Mitigation Measures	Instrument
Temporary increase in sedimentation of receiving water channels and increased turbidity of surface water	Disposal of construction spoils and excess soils into designated landfills Stockpiling of excavated materials away from water channels and runoff Provision of perimeter canals around stockpiled materials Regular clearing of canals and drainage; and, Practice of good construction site housekeeping.	-ESMP -Contractors Environment and Occupational Health and Safety Plan (CEOHSP)
Increased nuisance from dust	Regular sprinkling of affected areas with water during dry days; and, Imposition of vehicular speed limits in residential areas.	ESMP CEOHSP
Increased nuisance from noise	- Avoid construction activities at night; and, - Ensure all equipments are in good condition.	ESMP CEOHSP
Increased health and safety risks for the local residents and workers due to exposure of hazards from construction activities, non-resident population and traffic;	- Provision of barriers/fences and warning signs at dangerous areas - Imposition of speed limits in residential areas - Medical screening of workers by the contractors - Provision of adequate water and sanitation facilities at campsite - Wearing of PPEs - Provision of temporary safe passageways for residents; and, - Proper waste disposal and good housekeeping.	ESMP CEOHSP
Temporary migration of wildlife away from construction site	- Provision of wildlife corridors when feasible and practical - Banning of hunting and poaching of wildlife by workers; and, - Avoidance of night time activities.	ESMP CEOHSP
Interruption in irrigation water supply	- Proper scheduling and timing of affecting repair activities - Consultation with farmers/users of water - Prevent emptying of reservoir such as by using a cofferdam around portions to be repaired/constructed; - Keeping the old inlet operational; or, - Provision of alternative source	ESMP
Damage to existing infrastructure due to construction traffic especially the hauling of embankment materials;	- Contractor to undertake regular repairs of construction routes; and, - Construction of temporary detours to avoid weak bridges.	ESMP CEOHSP
Loss of crops, trees and other properties due to permanent and temporary land use by the subproject.	- Conduction consultations with the affected households for an agreed compensation plan - Implement the agreed compensation plan	RAP
Possible land and soil degradation in the construction sites and	- Contractor to practice good construction site housekeeping	ESMP CEOHSP

Common Impacts	Typical Mitigation Measures	Instrument
vicinities, include lands used for temporary easements and quarries due to compaction, litters, improper disposal of construction wastes and spoils.	<ul style="list-style-type: none"> - Avoidance of spillages of fuel, oil and grease - Disposal of construction spoils into the designated landfill only - Clearing and restoration of construction sites after completion; and, - Practice proper waste collection and disposal system. 	
Loss of land (land use rights) of some households due to permanent land use by the sub-projects	<ul style="list-style-type: none"> - Undertake consultation with the affected households and agree a resettlement/compensation plan which is compliant with the World Bank OP/BP 4.12. - Undertake the process of land clearance - Implement the resettlement plan. 	RAP
Possible increased use of pesticide.	MARD to introduce and/or promote Integrated Pest Management approach within the irrigation service areas	ESMP
Possible chance finds of archaeological sites, artefacts	Adopt a Change Find Procedure	Chance Find Proc.
Possible encounter of unexploded ordnance (UXO)	<ul style="list-style-type: none"> - Immediately stop activities, secure the site and contact authorities. Contact details of the authorities should be available. - Follow UXO procedure. 	UXO Procedure
Lack of means for lodging complaints or claims for compensation of damage during construction	Set up a Grievance Redress Mechanism for the sub-project	Grievance Redress Procedure

10. Monitoring will focus on compliance with the ESMP and CEOSHP. This will be done by the project owner on a daily basis as part of the ground supervision of construction. Environmental quality monitoring will also be conducted by the project owner as part of the standard requirements of the national legislation.

11. Temporary water restriction (during subproject rehabilitation). Given the small scope of dam repair, and the currently proposed measures (in the ESIA) that aims to avoid water restriction, the potential adverse impact (due to temporary lack of water) on farming activities could be avoided, or minimized. As part of the mitigation measures, dam repair activities would be done during dry season when the cropping area are minimal, and when the type of crops grown by farmers does not rely on large quantity of water to sustain the crops. In the event where such adverse impact are anticipated when the detailed engineering design are finalized, socioeconomic survey and consultation will be done to assess the potential loss of income, as well as loss of other economic opportunities of local people as a result of the water restriction (to allow dam repair). The RAP which was already prepared for this subproject will be updated to reflect the nature and scope of impact, consultation outcomes, and relevant compensation and support packages to ensure the affected people are not worsened off, in economic term, as a result of the subproject implementation.

12. Responsibilities and Institutional Arrangements:

The Central Project Office (CPO) takes responsibility for supervision overall progress of the sub-project, including the implementation of environmental protection measures proposed in ESMP.

The Sub-project owner has responsibility for ensuring that the ESIA is effectively implemented. The sub-project owner will carry out the task, but not limited to the following: (i) Assign a

qualified staff to be responsible for taking actions related to environmental safeguard and ensuring effective and timely implementation of ESIA; (ii) Assign a Construction Supervision Consultant (CSC) and/or field engineer to be responsible for supervision of the contractor's safeguard performance as part of the construction contract; (iii) Include the subproject ESMP/ECOP, CEOHSP into bidding and contract documents and ensure that contractors are aware of these obligations; (iv) Prepare monitoring reports to submit to CPO/WB.

Contractor Responsibilities: Contractor is responsible for carrying out civil works and informs Sub-project owner, local authority and community about construction plan and risks associated with civil works. As such, contractor is responsible for implementing agreed measures to mitigate environmental risks associated with its civil works as well as CEOHSP.

13. Public consultation. In each ESIA preparation, the two consultations with local communities, the affected people and the communal officials were carried out by project owner about project's impacts on environment, social and mitigation measures. During the consultations, the local communities expressed full consensus and support for the subproject implementation while the sub-project owner has committed to follow the proposed mitigation measures mentioned in the ESIA. They also gave some recommendations for minimizing impacts on environment, social to be received and committed to implement by project owner. It also committed to coordinate with local authority to manage worker on site and reduce conflict between worker and local residents, reduce traffic accidents following the sub-project ECOP/ ESMP.

14. Disclosure. As per Bank's requirement, the ESIA's have been disclosed in Vietnamese on the website of the Ministry of Agriculture and Rural Development, CPO and at local level, particularly at the office of PMU, District PCs, Ward/Commune PCs. The English version of this Executive Summary of the ESIA's will be also disclosed at the World Bank InfoShop in Washington DC prior to project appraisal. The RPF, EMPF, RAPs, EMDPs, and SAs have been disclosed in Vietnamese locally, and in English at Bank's infoshop prior to project appraisal.

B. Individual ESIA Executive Summaries Attached

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I. Subproject: Repair and Improvement of Khe Gang Reservoir, Nghe An Province

1. The “Rehabilitation of Khe Gang Dam and Reservoir” is one of the sub-projects being proposed for funding under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). The objectives of the subproject are: (i) to ensure the longterm viability of the dam and reservoir; (ii) to ensure the safety of 2,500 people within the immediate downstream of the dam and the protection of 1,500 ha of agricultural and natural area, and downstream infrastructures particularly community buildings and the exposed segments of the National Road 48b and the Nghia Dan – Quynh Luu Railway; (iii) to ensure stable water source for irrigation of 120 ha of rice and 55 ha of seasonal crops and for domestic use and animal production. This environmental and social impact assessment (ESIA) was undertaken to comply with the World Bank's Environmental Assessment Policy and the Vietnam's Law on Environment Protection.

2. The Khe Gang reservoir in Ngoc Son commune, Quynh Luu District was built in 1991. Ngoc Son is situated in the partly mountainous area of Quynh Luu District, along 48B road from Nghia Dan to Cau Giat, 9km far from Cau Giat district center in the south. The dam and reservoir is owned by Nghe An Department of Agriculture and Rural Development (NADARD) and managed by the Ngoc Son Commune Dai Son Agriceultural Cooperative. It was built under the aid of Belgian Government with design reservoir storage capacity of the reservoir of 1.7 million m³. The basin area is about 5.25 sq km. The resevoir is the source of irrigation water for the 120 has of rice lands and 55 ha of vegetables and seasonal crops lands. The existing headworks consist of the following structures:

- *Dam*: It is homogeneous earth dam with crest elevation of +26m, crest length of 460m and crest width of 3 to 4m. The maximum height of the dam is 12.5m
- *Spillway*: It is an earth and broad-crested free spillway, 45m in width and +23.6m of the overflow elevation
- *Water Intake*: It is an unsubmerged box culvert with dimensions of 0.8m×0.8 m, length of 50m, and, inlet elevation of +18.30m; and,
- *Management/Access Road*: It is a 320-m long dirt road with irregular width of 2-5 meters.

3. The current state of the dam does not guarantee safety. Over the years, the earth dam has degraded with dam face now substantially reduced and crest height becoming uneven. The construction of this dam is of low quality with a crude trench that resulted in infiltration of water through the body and foundation of dam. The protective layer of Burrow Pit stone on the upstream face has been slipping while the protective layer of grass graft downstream face has been severely eroded. The headworks of the Khe Gang reservoir has deteriorated. Moreover, the earth spillway which lies on the right side of the dam has also been eroded and damaged, especially towards the side of the contiguous abutment and the downstream spillway. There is currently no management house/office on site or duly trained dam management staff. There is also no operating procedures and plans for flood prevention or emergency preparedness plan (EPP). People are mainly dependent on water for production and daily activities from the Khe Gang reservoir. So the situation of water shortage are common occurrences when drought occurs.

4. There are about 2,500 people within the immediate downstream of the reservoir, producing rice on 1,500 ha of land. A national road (48B) and a railway (Nghia Dan-Quynh Luu) pass through the area and serve as the life-line connecting the west of Nghe An with to the coastal districts. The deteriorating condition of the dam also threatens the safety of these infrastructures as well as the lives and assets of downstream communities. In the recent years, due to the deteriorating condition of the reservoir, the water supply capacity has been reduced, adversely affecting the economic development of Ngoc Son Commune.

5. Rehabilitation and Upgrading Works: The proposed repair and upgrading works are based on the recommendations of the Dam Safety Assessment conducted on the dam. These include: the repair and upgrading of the dam body and foundation, reinforcement of the spillway, replacement of the water

intake, construction of a small 54.6-sqm floor area management house, and the rehabilitation and upgrading of the existing management/access road. Sufficiently detailed plans for the sub-project repair works and their implementation have been prepared and served as the basis for the ESIA.

6. Environmental and Social Screening: Based on the Environmental and Social Screening, the sub-project is eligible for financing under DRSIP. The subproject is a Category B under the World Bank's classification. It is not located within or near any sensitive environment or natural habitat and there are no structures or sites in the area of cultural and historical significance that will be impacted by the rehabilitation. There are also no ethnic minorities in the area. The dam to be rehabilitated is by definition under World Bank OP/BP 4.37 is a small dam having a maximum height of less than 15 meters and storage capacity of less than 3 million cubic meters.

7. Environmental and Social Impacts: The sub-project when implemented will improve dam safety, protecting downstream infrastructure and the lives and assets of local people downstream of the dam. The repair and rehabilitation works will also ensure stable and reliable supply of irrigation water for the 175 ha of rice paddies, vegetables plots and aquaculture ponds, and supplement the existing groundwater source for domestic use of local people in dry season. However, there will also be some negative social and environmental impacts. These include: (i) loss of land, crops and economic trees due to land and temporary construction easement requirements of the sub-project; (ii) likely interruptions in irrigation service during the dam repair which would affect crop production; and, (iii) other temporary impacts associated with construction activities.

8. A survey of the area indicates that about 0.5 hectare will be permanently used by the sub-project while a total of about 1.0 hectare will be temporarily used during construction. Portions of these lands are currently planted with perennial crops and commercial trees while the rest are covered with shrubs and low value trees. The use of land by the sub-project will not displace any house or structure. The land is owned by the People's Committee of the Ngoc Son Commune. The household currently using the land will be compensated and supported sufficiently to comply with the World Bank's Involuntary Resettlement Policy (OP/BP 4.12) through a Resettlement Action Plan/Compensation Plan.

9. The short term impacts associated with construction activities include: increased noise level within the construction site; increased concentration of particulate matter (mostly dust) along within the construction sites and the construction routes; increased sedimentation and turbidity of the reservoir and water channels; traffic disruptions; possible damage to existing roadways by the heavy equipment traffic; and, a slight increase in health and safety risks for the workers and local population due to exposure to hazards at construction site.

10. The long term impacts include possible land degradation within the vicinities of the construction and burrow pits due excavation, construction spoils, boulders, materials and rubbish and used oil contamination. The improved irrigation supply could stimulate intensified agricultural cultivation in the service area and lead to long term increase in the use of pesticides.

11. Mitigation Measures – An Environmental and Social Management Plan (ESMP) has been developed as part of this ESIA to address these impacts. The ESMP requires the adoption/implementation of the various other safeguards instruments which have been prepared for the sub-project such as, the Resettlement Action Plan/Compensation Plan, the Communication Plan, the Gender Action Plan, the Grievance Redress Procedure, the Chance Find Procedure, and the Unexploded Ordinance Procedure.

12. Specific measures in the ESMP include: continued use of the old intake while the new intake is being constructed and the use of cofferdam to avoid draining of the reservoir and cause disruption in water supply; proper housekeeping at the construction site; disposal of construction spoils to a the designated landfill sites; regular sprinkling of the construction sites and routes near residential areas during dry days; and, the preparation and submission by the Contractor of its own Environmental and Occupational Health and Safety Plan for the construction site, incorporating construction-related measures and standard construction EHS practices such as wearing of PPEs, provision of adequate

water and sanitation facilities at campsite, medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations. The ESMP also requires the installation of a capacitated Dam Management Unit and the preparation of Emergency Preparedness Plan as recommended in the Dam Safety Assessment Report.

13. As most of the impacts are construction-related, the contractor will be required to prepare its own Contractor's Environmental and Occupational Health and Safety Plan (CEOHSP) which would incorporate all construction-related measures in the ESMP and industry Health, Safety and Environment (HSE) standards and good practices, including good housekeeping at construction site, waste management, provision of adequate water and sanitation facilities, provision of safety corridors/passageways, installation of barrier fences around dangerous areas and wearing of PPEs. The CEOHSP will be reviewed and approved by the MARD Central Project Office (CPO) before construction can commence in the site.

14. To address possible long term increase in pesticide use, the MARD and provincial DARD will introduce and promote Integrated Pest Management approach in the irrigation service area.

15. Consultations: On October 17, 2014, the first consultation meeting was held with 22 participants, while the second consultation was held in a wider scale on March 30, 2015 with 200 participants in the People's Committee of Ngoc Son commune. The participant included representative of Commune People's Committee, Fatherland Front Board, social organizations, the affected households and local people in project area. Impact assessment consultation: Local people, the local governments in the project areas were shared information about the potential social impacts on the community health during project construction arising from the project activities. Policies for affected people is explained and made clear. The possible impacts associated with construction activities were discussed. The people require the contractor to ensure commitment rightly to minimize the adverse impacts as per presents in Environmental and Social management and Monitoring plan. They also require PPMU to pay special attention on keeping the road system from damaged during transportation process of large trucks.

16. Resettlement Action Plan: The construction of sub-project will acquire a certain area of land and assets on land owned by 01 HH of Ngoc Son Commune, Quynh Luu District, NgheAn province, in which (i) 5,000 m² land for perennial trees are owned by 01 HH, (ii) 10,000 m² temporarily are managed by the Ngoc Son CPC. Land area to be acquired: Permanently acquired land: 5,000 m² land for planting perennial trees owned by 01 HH; temporarily acquired land: temporarily acquire 10,000 m² managed by Ngoc Son CPC. Loss of assets on land: Trees: 5,00 kinds of various trees like Acacia, and Eucalyptus owned by 01 HH; Building/ Structure: None of HHs is affected nor any HH will have to relocate. Funding for compensation, support and resettlement: Total cost of compensation, support and resettlement for the sub-project is VND 316,485,000, equivalent to \$ 15,070.

17. Risk of dam broken failure: Currently, the downstream of Khe Gang dam is settled and stable. It supports 2,500 people and 1,500 ha of land. About 300 m of the dam foot in the direction of downstream is National Highway No. 48B and Nghia Dan - Quynh Luu railway, there are two arterial roads linking the western region of Nghe An with the coastal lowland districts. 1 km of access road, 3.5 km of canal route, 4 schools, 1 health center, and 1 administrative office are also protected by the Khe Gang dam. If the dam is broken, the losses of lives and property of the people are immeasurable.

18. Budget allocation: The estimated cost of the implementation of the ESMP, including compliance monitoring is VND 958,205,000 equivalent to US\$ 44,160. The total estimated cost of the sub-project including implementation of the ESMP is VND 47,009,591,000 equivalent to US\$ 2,166,000.

II. Sub-project: Repair and Improvement for Safety of Ngoi La-2 Reservoir, Tuyen Quang province

1. The “Repair and Improvement for Safety of Ngoi La 2 Reservoir” is one of the sub-projects being considered for first year implementation under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). This ESIA is prepared in compliance with the World Bank Safeguard Policy and the Vietnam Law on Environmental Protection (LEP).

2. Background: Ngoi La 2 reservoir is located in Trung Mon commune, about 7km south of Tuyen Quang city. The reservoir was built in 1973. The catchments area of the reservoir is 16.7 km² with reservoir capacity of 3.24 million m³. Its headworks and auxiliary works consist of following structures:

- *Dam:* The dam is homogeneous earth dam with the maximum height of 15m, length of 556 m and crest elevation +44.5m with width of 3.5m
- *Spillway:* The spillway is 5.0m wide and covered with reinforced concrete with thickness of 10cm. The spillway is provided with a chute and a cushioning pool
- *Water intake:* The intake is a reinforced concrete structure. It is a box sewer with upstream regulator tower gate
- *Management and operation route:* Route to Ngoi La 2 from National Road No. 2 is asphalt paved with a width is of 3.5m and length of 2430 m; (ii) Route from Ngoi La 1 reservoir to Ngoi La 2 reservoir is currently an earth road with length of 1.8 km. The road has steep slope and is slippery during rainy season.

3. The dam is unsafe and currently in need of repairs and improvements. The problems include erosion and water leakage. In particular, there is serious erosion in the upstream face of the dam while the downstream toe is leaking as reservoir water seeps through the dam body and foundation. The spillway's wall was built long time ago, the drainage ditches were damaged, seepage formed along both sides of the wall. Some areas were peeled off. The height of the wall is low, the rocks from two sides fall into the spillway and plants are growing right in the wall. Two sides of the water slope appear many erosion holes and due to surface runoff and seepages. The curved upstream canal is inadequate and unable to take in floodwater. The water intake is still manually operated and the operation bridge and covering house are damaged. Although several facilities had been reinforced, many items of the headworks have been degraded and the capacity of the reservoir to store water is low. According the Bank's Dam Safety policy, safety of the work under the PMF (Possible Maximum Flood) was considered.

4. Proposed Repair and Improvement: The proposed repair and improvement include: (i) repairs in the dam body and foundation to fix the seepages and eroded portions; (ii) reinforce upstream slope with concrete and riprap, plant grass and build drainage ditches on downstream slope; (iii) replace the valve and gasket of the water intake; (iv) expand the spillway from 5 m to 17 m in order to ensure safety for the main dam in the event of PMF and building of a new bridge across the spillway; and (v) upgrade the 1.8 km access/management Road. The main objectives of the subprojects are: (i) to ensure the safety of the reservoir, making it climate resilient, better protect the people and infrastructure at downstream; (ii) to ensure that the original design of irrigating a total of 1,054 ha of rice and other crops in Trung Mon and Kim Phu communes of Yen Son district, and in Y La Tan Ha and Hung Thanh wards of Tuyen Quang city; and (iii) to ensure water supply for 15 ha aquaculture farms.

5. Results of environmental and Social Screening: Based on the Environmental and Social Screening, the sub-project is not located within or near critical natural habitat and there are no rare or endangered species in the area. There are also no sites, structures or monuments with cultural, religious or historical significance within and in the vicinities of the construction site. In terms of ethnic minorities, ninety-five percent of the people in the area belong to the Kinh person who currently constitutes the mainstream population of Vietnam and there are no ethnic minorities among those affected by the sub-project. The dam, having a height of 15 meters and a reservoir capacity of more than 3 million cubic meters, is considered a large dam under the World Bank Safety of Dam Policy

and hence will be required to submit a Dam Safety Plan and be subject to a review by a panel of experts.

6. Environmental and Social Impacts: The overall potential impacts of the sub-project are positive. It will bring about in considerable benefits to local community, particularly in terms of (i) providing a stable and reliable water supply, facilitating agriculture production and improving the lives of the local people; (ii) improving the safety of the dam in order to protect the people downstream of the dam, their lives, assets and livelihood. However, there will also be some negative social and environmental impacts such as (i) land acquisition, loss of some vegetation cover and some trees need to be cut down; (ii) there is a risk that some unexploded objects may be left at the site from the war; (iii) safety risks for workers and local community related to construction activities, operations of construction plants and vehicles; (iv) other common construction impacts such as dust, noise, waste and waste water generation, damages to existing local roads. The main concern during operation phase would be the flooding risk at downstream of the spillway channel after the spill way is expanded.

7. Mitigation Measures: In order to address these impacts, A Resettlement Action Plan (RAP) an Environmental and Social Management Plan (ESMP) has been prepared. The RAP estimated that 815,542,200 VND (approximately 38,000 USD) will be paid to affected households; In the Feasibility Study, a budget of one billion VND (approximately 46,500 USD) was reserved for UXO clearance at 2.17 ha of land along the access road and the left shoulder of the spillway before construction is started. To minimise the potential impacts related to dust, noise, traffic disturbance, traffic safety, the subproject chose to upgrade the route that is currently in poor condition but passing minimal (5 households) for use during construction phase. The estimated cost for access/management road rehabilitation is approximately 5.5 billions VND or 256,000 USD. To reduce the potential impacts related to approximately 43,000 m³ of excavated materials, the subproject planned to reuse 9,501 m³ for filling. The rest will be disposed of in a disposal area where a restraining 2 m tall wall will be built to prevent the materials from being washed down to the rice field at further downstream. Other construction impacts would be managed through proper construction method and schedule, and a set of environmental specifications that would form part of construction bidding document. The potential impacts related to increased flood discharge rate through the spillway to downstream area will be studied and addressed in the detail engineering phase of the subproject. The Ngoi La 2 Project Management Unit will be responsible to ensure that the ESMP are implemented during the engineering design, bidding, and construction phases.

8. Consultation: The consultation was on January 23, 2015 with around 200 participants at House of culture, hamlet 23, Kim Phu commune. The participant included representative of Commune People's Committee, Fatherland Front Board, social organizations, the affected households and local people in project area. Environmental and Social impact assessment consultation: The affected land area by subproject mainly is farmland and vacant land managed by the CPC. The affected households desire to get updated information on implementation progress of subproject. The affected households want to be compensated adequately and manifestly according to the replaceable price for damaged assets and the market price for temporary affected farming products. Both male and female participate in local organizations and propose ideas relate to subproject; hence the gender issue has been ensured, 100% agree with the measures to minimize environmental pollution as presented in the report. Propose with project owner to apply appropriate regulations with commitment to minimize the adverse impacts as well as environmental quality management and supervision. In addition, a small consultation was held earlier.

9. Resettlement Action Plan: Land area to be acquired permanently is 22,100 m² under this subproject, in which 17,880 m² will be acquired for access road upgrading and 3920 m² of land would be acquired for dam and spillway construction. One household will need to be relocated as 300 m² of their residential land would be acquired as it is located within the safety corridor of the dam. 11 other households would also be affected with the acquisition of 2,245 m² land area. 115 trees, mostly fruit trees such as dragon fruit, grapefruit, mango trees, etc. of 11 AHs will need to be cut off. In which, estimation of 416,277,000 VND of compensation and assistance for land, structures and architectural

facilities and trees/crops will be paid, others assistances are estimated of 325,125,000 VND. The RAP estimated that 867,440,000 VND (approximately 41,306 USD) will be paid to affected households;

10. Risk of dam broken failure: The downstream of Ngoi La 2 dam is settled and stable. It supports about 2,000 households in village 2,3,4,5 and 6. The national road no.2 and infrastructures of Tuyen Quang city are parallel to the dam route in the downstream. Currently, the following infrastructures are protected by the Ngoi La 2 dam: 10km of access road, 6.8 km of canal route, 1 school, 2 administrative offices, and two 35kV electric lines. If the dam is broken, the losses of lives and property of the people are immeasurable.

11. Budget allocation: The estimated cost of the sub-project is **63,924, 000,000 VND**. The estimated cost of the implementation of the ESMP, including monitoring is 609,158,000VND (equivalent to \$ 27,943), in which 501,158000 VND will be for monitoring; Capacity building: 28,000,000 VND; IMP training: 80,000,000 VND.

III. Sub-project: The repair and rehabilitation of Ho Ban reservoir, Phu Tho province

1. Background: The repair and rehabilitation of Ban reservoir has been identified for priority implementation under the Dam Rehabilitation and Safety Improvement Project (DRSIP), a project being developed for World Bank funding. The proposed works have been determined based on the Dam Safety Assessment being conducted in accordance with the World Bank Policy on Safety of Dams (OP/BP 4.37) and the Vietnam dam safety standards. It is subjected to Environmental and Social Impact Assessment (ESIA) in compliance with the requirements of the World Bank OP/BP 4.01. The following is a summary of the ESIA report.

2. Ban reservoir is located in Tien Luong Commune in the Cam Khe district of Phu Tho province. It was built in 1976. The reservoir has a storage capacity of 1.68 million cubic meters and supplies irrigation water to about 150 ha of agricultural land belonging to the residents of Tien Luong commune. Due to the long-time exploitation, the dam is now in urgent need of repair and rehabilitation. The current status of headworks is as follows:

- The dam is an earth dam with a total length of 354 m, and crest height of 11.0 m, consisting of three dams A, B, C. The upstream face of dam has not been reinforced and some places near the spillway has already been eroded.
- The spillway is also an earth spillway. In the rainy season, the flood discharge capacity proved inadequate and the spillway has suffered serious erosion, especially at the downstream side. To remedy this inadequacy, before each rainy season, the local people have to discharge water through the drain to prevent erosion at the spillway thereby effectively reducing the water holding capacity of the reservoir.
- The outlet works intake has a broken valve and the outlet works needs to be repaired or replaced.

3. Downstream of the Ho Ban reservoir live about 194 households, of which 102 are considered poor or nearly poor, cultivating 150 ha of rice and vegetables. The deterioration of Ban irrigation works has reduced the irrigation water supply and water supply for other uses which is vital for the economic development of the area. It also threatened the safety of the downstream communities, farms and properties.

4. The current status of dams do not provide safety. At Dam A, the dam crest is used as road by the locals resulting in the deformation of the crest due to the impact of vehicle traffic. At the edges of the upstream and downstream slopes, trees have overgrown providing habitat for burrowing animals that may have further affected the integrity of the dam structure. The current width of the crest is only 4,0 m which is smaller than the minimum standard width for compacted earth dam TCVN8216-2009 (III. level work, minimum crest dam width $B=5m$). Thus, expansion and reinforcement of crest dam is necessary. The upstream slope of the dam has not been fixed and many trees grow on the slope. In addition to this situation, the effect of increasingly severe weather events such as heavier rains and stronger winds could cause erosion and landslides. Similar with Dam A, the crest of Dam B is also used as road by the local community. The road is an unpaved earth road with uneven surface. There are also many trees and plants on the edges of the upstream and downstream slopes. There is no breakwater wall, lighting system, displacement landmark for monitoring or seepage on dam body monitoring equipment. Dam C crest is also used for travelling purpose, this road is earth currently with a lot of convex and concave. On dam crest, at edge of both upstream and downstream slope, trees overgrow. Dam crest is affected by both nature and human. Dam crest is deformed, eroded and recessed, not reinforced. That may affect safety and stability of dam.

5. Proposed rehabilitation works. The rehabilitation of reservoir is intended to: (i) ensure the safety of the reservoir during operation, retrofit for extreme weather events; and, (ii) meet increasing demands for water supply in the downstream area by ensuring that the original design goal of supplying water to 150 ha of rice and vegetables is achieved. The proposed works include the repair and upgrade of the dams, the spillway, the outlet works intake, and the repair of the construction and management routes, including some structures along the construction route. The project has been designed and will be

implemented in accordance with World Bank Safety of Dam Policy (OP/BP 4.37) and dam safety standards and criteria of the Socialist Republic of Vietnam.

6. Environmental and Social Screening. The subproject underwent mandatory environmental and social screening as agreed with the World Bank, to among others, determine any ineligible activities from the safeguards policies point of view and determine the scope of the assessment. The results of the screening indicate that the subproject will not result in increase of the designed water storage capacity of the dam. The proposed civil works falls under the World Bank Environment Category B while the dam is considered “small” based on the World Bank classification. There are significant ethnic minorities and they account for 6.3% of population in Tien Luong commune. However, they generally do not live in cluster or communities but integrated with mainstream population and impacts caused by the project will affect overall community, but not particularly to an ethnic group. There are no graves, temples or any structure or sites with cultural, religious or historical significance in the subproject area. Due to urbanization, there are no more pristine forest, critical natural habitat, or protected natural areas within 20 km radius of the construction site. There are no rare plants and animal species that need to be preserved.

7. Environmental and social impacts and mitigation measures: The subproject will bring in considerable benefits to the local community in the form of improved safety, stable and reliable water supply and general improvement in the landscape of the dam. However, the project implementation will be results in some negative impacts and raise some issues that need to be addressed, as follows:

8. Loss of land and crops - The subproject will permanently affect an alluvial land area of 1.5 ha of mostly vacant and garden land of 15 households. In addition, about 1,100 sq m of land that is currently managed by Commune will be temporarily used for construction purposes. No household will be relocated as the land to be used do not include residential lots. The crops to be affected consist of 95 trees, including apples, guavas, grapefruits and star fruits.

9. Impacts of construction activities. The negative impacts of construction activities are as follows:

- Temporary increase in sedimentation of the waterways during rainy days due to earthmoving activities. The subproject will require excavation of 6,400 cubic meters of soil materials which will be mostly utilized for backfilling, only less than 100 cubic meters will be disposed.
- Increase in dusts nuisance within the construction site and along construction routes
- Increase in noise levels within the construction site
- Interruption in water supply during the repair works affecting agricultural production in irrigation service areas and domestic water supply
- Possible damage of existing roadways due to heavy equipment traffic particularly the hauling of embankment materials
- Increase health and safety risks among local residents near the dam and along construction routes due to exposure to construction-related hazards
- Domestic and hazardous waste - The amount of domestic wastes (i.e. wastewater and solid waste from a maximum of 50 workers) will not be significant but these would require standard containment (i.e. septic tank, soak pit), collection and disposal (i.e. solid wastes to the landfill). Hazardous materials will also require imposition of standards industry practice of storage and containment in case of spillage.

10. Long term impacts – The following are long term negative impacts, expected to be felt beyond the completion of the subproject.

- Land and soil degradation – This could occur at the construction sites and vicinities due to loss of vegetation, alteration of landscape due to excavation, compaction, construction spoils, litters and wastes.
- Increased use of pesticides - The improved irrigation water supply is also expected to promote intensive agricultural production in the service area thereby increasing use of pesticides.

11. Mitigation Plan: To address these impacts, an Environmental Management Plan (ESMP) has been prepared as part of this ESIA report. The ESMP requires the adoption/implementation of the various other safeguards instruments which have been prepared for the sub-project such as, the Resettlement Action Plan/Compensation Plan. The specific measures in the ESMP include:

- Implementation of the RAP
- Careful and optimal scheduling of construction activities to coincide with fallow periods, in close consultation with the affected farmers to minimize cropping disruptions.
- Imposition of good housekeeping practices at the construction site in terms of storage of materials, disposal of construction spoils to the designated landfill, regular sprinkling of roads in residential areas during dry days. All these to be incorporated in Contractor's own Environmental and Occupational Health and Safety Plan (CEOHSP) together with standard construction EHS practices such as wearing of PPEs, provision of adequate water and sanitation facilities at campsite, waste management including domestic wastewater and hazardous waste medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations. Compliance with the relevant environmental protection criteria should also be included in the plan.
- Requiring the contractor to undertake site clearing, cleaning and restoration after completion of works, including the levelling of stockpiled surface soils in the burrow pit area and returning the ground for people to continue farming.
- Introduction and promotion by MARD of the Integrated Pest Management (IPM) technologies and approaches among the farming communities within the irrigation service areas.
- Constant communication and consultation with the stakeholders during construction to apprise them of the status and progress and also to hear complaints and problems
- Adoption and setting up of Grievance Redress Mechanism
- Adoption of Chance Find Procedure and Unexploded Ordnance Procedure.

12. Consultation: Two consultation meetings were held. The first was in January 24, 2015 with 11 participants. The participants in this meeting were at Phu Tho Province DARD, Department of Natural Resources and Environment, Department of Construction, Department of Transportation, Department of Culture, Department of Health, Department of Education. The second consultation meeting was on January 29, 2015 with 30 participants. The participant included representative of Commune People's Committee, Fatherland Front Board, social organizations, the affected households and local people in project area. Environmental and social impact assessment consultation: The land acquisition of Phu Tho subproject is not significant since the upgrading and repair based in the former line; therefore the adverse impacts can be minimized and land acquisition scale is insignificant. The affected households want to be compensated adequately and manifestly according to the replaceable price for damaged assets and the market price for temporary affected farming products. People expect the PMU and contractor execute the project with high quality. The implementation of the project should be met the schedule. Project implementation procedure will be complied strictly from the investment plan to construction activities.

13. Resettlement action plan: The subproject will permanently affect an alluvial land area of 1.5 ha of mostly vacant and garden land of 15 households. In addition, about 1,100 sq m of land that is currently managed by Commune will be temporarily used for construction purposes. No household will be relocated as the land to be used do not include residential lots. The crops to be affected consists of 95 trees, including apples, guavas, grapefruits and star fruits. The fund for the preparation and implementation of compensation, assistance and resettlement of the project will come from the counterpart fund (government budget and Phu Tho provincial budget). The compensation cost for land is 690,000,000VND. The compensation cost for trees is 4,900,000VND. The compensation cost for garden land acquisition is 810.000.000VND.

14. Risk of dam broken failure: If the dam is broken, the losses of lives and property of the people in downstream area are immeasurable because, the downstream of Ban reservoir supports 196 households on a land area of about 20,000 ha. Infrastructures in the area consist of about 250 houses, 1 kindergarten, 1 primary school, 5 cultural center houses, 1 temple in zone 7, 4 transformer stations in

zone 5, 7, 8, 9, inter-village road system, inter-district road passing zone 6 connecting to Yen Lap district, and many other works. Local people primarily depend on agriculture, in case of inundation and flood, the whole cultivated area will be destroyed, resulting into lack of food, which may take many years to return to initial condition ensuring for farming. Currently, the following infrastructures are protected by the Ban dam: 6.2 km of access road, 8.1 km of canal route, 1 school, 1 health center, and 2 administrative offices.

15. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is: 30,088,212,000 VND. This budget includes the estimated cost of ESMP implementation of USD39,100 (VND 853,942,000). In which, cost for capacity training is USD15, 110 (VND330,000,000), and environmental and social monitoring of USD 23,990 (VND 523,942,000).

IV. Subproject: Repair and improvement safety of Dai Thang Reservoir, Hoa Binh Province

1. Background Information: Dai Thang Reservoir is one of the 12 dams identified for priority repair and upgrading works under the World Bank-assisted Dam Rehabilitation and Safety Improvement Program (DRSIP). This Environmental and Social Impact Assessment (ESIA) was conducted in compliance with the requirements of the Vietnam's Law of Environment Protection (LEP) and the World Bank's Environmental Assessment Policy (OP/BP 4.01).

2. Dai Thang Reservoir was built in 1960 and has been located in Duc Binh village, An Binh commune, Lac Thuy district, Hoa Binh province. The Dai Thang dam impounds water from the unknown creek, creating the reservoir up to a total capacity of 561 900 m³, an active capacity of 526 650 m³ and diverts the flow to the irrigation system canals. Beyond the 526.650 m³, the excess water flows through a free spillway into a downstream stretch of the unknown creek which flows further to the Cho Dap natural stream and then goes to the larger river as known as Dap River. The Dai Thang Reservoir supplies irrigation water for 100 ha of rice and for 30 ha of secondary crops, as well as recharging the groundwater table in order to increasing the water level in the dug wells for 200 households surrounding. The reservoir is designed and rated as Level III under the Vietnam dam classification. The headwork cluster and auxiliary works of Dai Thang reservoir consist of the following main components:

- *Dam:* It is a homogeneous earth dam with a maximum height of 15.3 m. and the crest elevation at +36.0 m. The length and width of the dam crest are 196 m and 3.5 m, respectively.
- *Water intake:* It is located in the body of the dam with reinforced concrete structure, discharge capacity of 0.15 m³/s, length of 96 m and diameter of 400 mm.
- *Spillway:* It is an earth spillway with the length of 65 m. It is located about 200 m from left abutment of the dam.
- *Management and operational road:* The management road that connects the dam crest with the inter-village one is earthen (about 110 m in length) and it is rather difficult to travel because of slippery state in rainy season. The operational road from the dam surface to the spillway is a path-way with a size of 0.5 m.

3. Present condition of dam does not ensure safety. The headwork is currently in a poor state. The reservoir is heavily sediment, resulting in 10 – 15% capacity reduction. The reservoir has not been dredged since it was constructed. The downstream face of the dam has been infested with termites (about 50 to 60 nests have been detected) and covered with wild grass and weeds. The dam body has five (5) lateral and one (1) longitudinal cracks with a sizes ranging from 1 to 2 cm. The upstream dam face has been eroded by waves and the downstream face has also been eroded by runoff which created troughs and uneven surfaces. The water intake inside the dam body has been leaking and not in a good condition and the overflow spillway is a virtually vertical drop with many deep troughs. There is currently no management house/office on site or duly trained dam management staff. There is also no operating procedures and plans for flood prevention or emergency preparedness plan (EPP).

4. The proposed repair and upgrading works: The repair and upgrading aims to: (i) ensure the safety of the reservoir during operation, increasing resilience against extreme weather events; (ii) ensure original design goals of supplying water for irrigation to 100 hectares of paddy rice, 30 hectares of other crops and domestic water for 3 villages (Duc Binh, Dai Thang, Thang Loi) in An Binh commune; and, (iii) ensure the safety of downstream communities and their properties. The proposed repair works include:

- Rehabilitation of the dam: Increasing the dam crest height from 15.3m to 17.9m without altering capacity of the reservoir
- Strengthening of the earthen spillway
- Replacement the old water intake by the new steel one, keep the same diameter of the conduit.
- Rebuilding of the management house of level IV

- Eradication of termites by using Metavina 10DP. This product can kill termites via direct exposure or infection
- Concreting and rehabilitation of the access/management road.

The proposed repair and upgradation of the headwork system is rated as Level II under the Vietnam dam classification. The subproject is designed based on the the dam safety program and standards of the Vietnamese government as well the World Bank Policy on Safety of Dams (OP/BP 4.37).

5. Results of the Environmental and Social Screening. The subproject underwent the Environmental and Social Screening as agreed with the World Bank. Based on the screening conducted, the subproject is a Category B under the World Bank OP/BP 4.01 classification. The subproject is not located within or near critical natural habitat and there are no rare or endangered species in the area. There are also no sites, structures or monuments with cultural, religious or historical significance within and in the vicinities of 20-km radius of the construction site. Muong ethnic minority people takes up 70% of the total population in the study area, many of them will be affected by the interruption of irrigation water during the repair period.

6. Environmental and Social Impacts. The subproject will bring in long term benefits to the communities particularly in terms of improved dam safety and reliable water supply. The negative impacts include the following:

Loss of land and crops – There are 12 households who will be lost lands to the subproject, 11 of them will lose agricultural lands while one (1) will be lost a residential land. In terms of crops, 1.2 ha of rice, 0.3 ha of maize, and about 0.1 ha of secondary crops and about 130 Acacia trees will be lost.

Reduced crop production or loss of entire crop season - About 244 households, mostly Muong ethnic, will be affected by the water cut off period during the replacement of the water intake. The area of rice paddies to be affected is about 57 ha and the cut-off would last between 2 to 6 months.

Impacts of construction activities – The impacts of construction activities include: increased sedimentation and turbidity due to significant earthmoving activities; dust nuisance from earthmoving activities and heavy equipment traffic; increased health and safety risks to local residents and workers due to exposure to construction hazards in the construction sites and routes; and, possible damage to existing roadways due to heavy equipment traffic.

Land degradation within and around construction site – The subproject could leave behind a degraded soil and land in the construction site in terms of deformed landscape and suitability for other uses due to excavation, structures, litters, construction spoils and other materials.

Increase use of pesticide – Stable and reliable supply of irrigation water in the service area would encourage intensification of agricultural production which could in turn result in increased use of pesticide over time.

Other issues that need to be address include possible encounter of unexploded ordnance leftover from the war; possible encounter of archaeological or paleontological artefacts during excavations. Perception of unfairness and claims compensations of accidental damages due to the subproject also need to be addressed.

7. Mitigation measures: In order to address these impacts, an Environmental and Social Management Plan (ESMP) has been prepared as part of the ESIA report. A Resettlement Action Plan (RAP) has been prepared to address the impact of land acquisition. Likewise an Ethnic Minority Development Plan (EMDP) has been prepared to address impacts on the Muong EM group. The following are the specific measures to be undertaken:

- Implementation of the RAP and EMDP

- Consultation with the farmers in the planning and timing of repair activities in the dam with the aim of minimizing impact of any disruptions in irrigation service
- Requiring the contractor as part of the contract, to undertake regular maintenance and repair of existing roadways it will be using during the construction period
- Requiring the contractor as part of the conditions of the contract, to prepare and submit to the PMU its own Environmental and Occupational Health and Safety Plan based on the construction-related measures identified in the ESMP, the national environmental criteria and standards as well as standard construction site safety and housekeeping practices, such as regular sprinkling at construction site to control dust, provision of warning signs, barriers on dangerous areas, and provision of adequate sanitation and waste handling facilities (i.e. septic tank and/or soak pit for domestic wastewater) at the base camp
- Requiring the contractor to undertake clearing, cleaning and restoration of construction sites and temporary easements after completion of works
- Introduction and/or promotion of Integrated Pest Management approach in the irrigation service area.
- Adoption and setting up of a Grievance Redress Mechanism for the local communities and other stakeholders
- Adoption of a Unexploded Ordnance Procedure; and,
- Adoption of Chance Archaeological Finds Procedure.

8. Consultation: In the process to prepare the ESIA report, the consultant in closely cooperation with PPMU conducted the community consultation on February 02, 2015. The participants include representatives of DARD, Department of Culture, DoNRE, Irrigation Exploitation Company, An Sinh commune etc. For the community in the project area, the community consultations were conducted from 6-7/2/2015 for the first time, and the second consultation was conducted on March 27, 2015. The main participants are the representatives of An Binh communes, Fatherland Front, Women Union, Village leaders and community members of 4 villages namely: Dai Dong, Dai Thang, Thang Loi and An Binh. The result of community consultation shows that there is strong community support for the project implementation. Besides, there are some recommendations from community such as: The constructor should comply the right mitigation environmental and social measures, apply the relevant compensation policy for 12 HHs whose land lost; and 244 HH affected by water cut during the culvert repairing; In the project area, there are 70% local people are EM, they wish to get support to their life; local people also wish to participate in the project implementation. For the above recommendation from the community, the project owner commits to comply fully the Environmental and social mitigation measures as mention in the ESIA. For the HH lost land due to the project construction, the project owners will apply the update compensation policy of the government and WB policy; besides, an EMDP has been prepared for this project, and project owner commit to create condition for local people to participate in the process of sub project construction.

9. Resettlement action plan (RAP): The implementation of Dai Thang reservoir will acquire permanently 15,935 m² and temporary 4,438 m². There are 12 HHs (45 people) affected by land. Besides, there are 244 HH will be affected by water interruption during the sub –project construction. The total area affected due to water interruption is 571,297 m² which include: agricultural land, forestry land and a small area of residential land. The total estimated compensation, supporting and resettlement cost is VND 5,441,935,000. In which VND 1,423,114,000 for compensation; the supporting cost is 3,309,019,181 VND that include cost to support for occupation change and job creation, cost to support the HH who affected more than 20% total agricultural land to stabilize their life, cost to support HH due to water interruption; management and contingency is 709,820,021 VND.

10. The Ethnic Minority Development Plan (EMDP): Muong Ethnic minority account for 70% total population in the Sub - project area. There are total 223 EM households (821 people) affected by the Sub project construction due to water interruption to the one –season paddy of 53,57 ha of EM. The consultation with EM in the FPIC manner show that there is broad community support from EM peoples for the subproject implementation. These EM development activities include: i) Livelihood rehabilitation for community; ii) Communication activities; iii) Support domestic water for

households. Total budget for these Development activities is 2,553,540,500VND. EMDP will be further updated on the basis of the detailed design of the subproject.

11. Risk of dam broken failure: If the risk of Dai Thang dam failure occur, it will affect to 8 villages of An Binh commune, the administration area of commune, kindergarten, Primary school, secondary school, health care station, post office and General health care clinic, etc. 6 km asphalted and concrete road, the electricity system of commune; 5km irrigation canal of Dai Thang reservoir; 130 ha of crops land and about 692 HHs (2272 people) will be affected.

12. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for subproject investment. Total budget estimation is: **VND 35,537,760,462** (~USD 1,645,266). In which Budget for ESMP implementation: VND 578,100,000) and the Budget for ESMoP implementation: VND 151,002,000.

V. Sub-project: The repair and upgrading of Khe Che Reservoir, Quang Ninh province

1. Background: The repair and upgrading of Khe Che Reservoir is one of the 12 sub-projects being proposed for first year implementation of the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). An Environmental and Social Impact Assessment (ESIA) is carried out to comply with the requirements of the World Bank Environmental Assessment Policy (OP/BP 4.01) and the Vietnam Law on Environment Protection (LEP). As part of the ESIA, the subproject underwent consultations with local communities regarding its associated social and environmental issues and impacts.

2. The reservoir is located at An Sinh Commune, Dong Trieu District, Quang Ninh Province, 78 km from Ha Long City and Hanoi Capital from 90 km, the reservoir was constructed in 1986. In 1995-1998, the dam was repaired and a number of items under head works system was upgraded. The reservoir lake has a basin area of 22.4 sq. km and the capacity of the reservoir is 12 million cubic meters. The head works and auxiliary works complex of the reservoir consist of the following:

- *Dam:* Dam is built with homogeneous soil at a height of 20m and length of 658 m. The crown level is at 26.9 m and 4.2 m wide.
- *Spillway:* The spillway is a long based weir with cement lining. The overflow is 5 m long and 14 m wide and a height of 23.48 m.
- *Off take regulator:* The off take regulator at the right abutment of dam has valve house at the upstream of dam. The regulator has a reinforced concrete structure with dimension of 1.0m × 1.3m.
- *Management and operation road:* The management and operation road along the inter-commune road up to the bridge has a concrete pavement while the section from bridge up to dam surface (about 110 m in length) is currently a dirt road. This road connects to the local road next to the lake.

3. Present condition of dam is poor and unsafe. The Khe Che reservoir has been operating for nearly 30 years now since the last major repair. Based on the Dam Safety Assessment conducted as part of the DRSIP preparation, the issues include: overflow channel has not been reinforced and the left abutment has a 30m long section of masonry. The wing wall at right abutment of the input section has been cracked; the dam surface has been raised. In the course of long-term use, landslides have occurred and sweating potholes have formed. Underbrush has grown sparsely along the crest while the upstream wall has some cracks. The head of coping dam has been broken. The management road is rough and full of potholes, making regular reservoir monitoring difficult and inefficient. The off take regulator valves installed in the 1990s has been rusted and no longer in use. The reservoir was designed and rated as a level III facility. However, recent floods have already exceeded the original designed parameters. The three communes downstream of Khe Che namely An Sinh, Tan Viet, Viet Dan with over 3000 inhabitants are currently at risk.

4. Proposed repair and upgrading works: The proposed works will: (i) ensure dam safety and the flood regulation function of the reservoir; (ii) ensure reliable irrigation water source for about 1,000 hectares of cultivated land, including 534 ha of rice; (iii) enhance the dam landscape and ecology for tourism; (iv) promote economic growth in the project zone, including the development of aquaculture. The following are the proposed work items:

- *Earth Dam:* Repair on the dams include rehabilitation and expansion of the downstream section to restore embankment at the desired compaction coefficient; reinforcement of the top of the dam by a 20-cm thick M200 concrete; exterminate termites; and fixing of the water seepages and penetration in the dam body and foundation.
- *Flood Spillway:* Works include expansion and upgrade of the overflow weir from 14 m to 24 m; the rehabilitation of the chute and flanks with reinforced concrete and rebuilding of the weir bridge, among others.

- *Water Intake:* Various repair works including clearing and re-lining of the culvert, reinforcement of the external valve tower, repair of the tower building and service bridge, replacement of the steel gate, etc.
- *Operation House and Communication System:* Construction of head works operation house with 4th grade house standard and gross area of 150m² and installation of automatic reservoir water level observation system to facilitate the works management and operation.
- *Power Line:* Installation of 1.8 km long LV wire lines from weir shoulder to flood spillway for management and operation purpose.
- *Management Road:* Reinforcement of the section behind the water intake to flood spillway with specifications of 1.7 km length, M200 concrete, 20cm thickness and 3m width. Hardening of 139-m road section towards the dam surface. Construction of rescue road which would also serve as the access road to the weir extension works.
- *Culverts:* Upgrading of existing two (2) culverts under the management road with reinforced concrete M250 to increase their flood discharge capacity. The two culverts are: Tan Viet culvert with 4 gates: 4 x (6x3.5)m; and Ba Xa culvert with 2 gates: 4 x (6x3.5)m.
- *Others:* Provision of equipment for rescue in case of floods and storms and monitoring equipment.

5. The subproject is designed based on the Dam Safety Assessment conducted following the World Bank Safety of Dam Policy (OP/BP 4.37) as well as the standards of the Socialist Republic of Vietnam.

6. Environmental and Social Screening. There are no critical natural habitats near the dam and the area is not known to harbour any rare or endangered species but a small portion (0.4 ha) of forested land will be permanently converted for use by the dam. The An Sinh commune where the construction activities will be implemented is mainly inhabited by Kinh who constitute the mainstream ethnic group in Vietnam. There are no ethnic minority households to be affected, however, there are 135 beneficiaries' ethnic minority households in sub-project, It is necessary to prepare an Ethnic Minorities Development Plan for the sub-project. The Dam is categorized as large dam and therefore subject to review by a Panel of Expert and submission of Dam Safety Plan. There are no grave, temple or any culture, belief, religious structures affected in the project area. Although the proposed repair works will use new lands but these are currently unoccupied and hence no households will be affected. The sub-project is an Environmental Category A as per World Bank OP/BP 4.01.

7. Environmental and social impacts. The implementation of the sub-project will bring huge benefits to the local community in a form of stable and reliable water supply, improved safety and better protection against floods. However, the subproject will have some negative impacts that need to be mitigated. The significant impacts are as follows:

8. Loss of trees and secondary vegetation - The sub-project will require acquisition of a total 24,620 sq. m of lands of which about 4,000 sq. m are forested lands which will be excavated at the mountain side for the expansion of the spillway and about 3,120 sq. m unused lands at the downstream at the foot of the dam to be used for disposal area, about 17,500 sq.m unused lands at the downstream at the foot of the dam to be used for landfill. These lands are unoccupied by any private individual and hence do not need Land Clearance from the government. There will be no impacts on households or crops.

9. Impacts of construction activities. According to the calculations, the total volume of excavated soil for construction works of the project is about 55,459 cubic meters while the volume of backfill soil is 3,412 cubic meters. Thus, about 51,051 m³ needs to be moved to the disposal area. The disposal area is located along the foot of the dam with total capacity of 52,500 cubic meters. The number of workers in the peak period is about 50 workers. The number of trucks is 3600 turns over a period of 10 months. Based on these, the impact of construction will be as follows:

- Temporary increase in sedimentation and turbidity of the reservoir
- Elevated concentration of dust at the excavation site, the foot of the downstream slope of the dam where excess soils will be disposed
- Interruption in the water supply for about 5-7 days during the repair of the intake

- Possible damage to roadways along construction routes, particularly on the 300-m route to Hai San pit and the 10-km inter-commune route to the Dong Trieu town centre
- Increased health and safety risk for residents and workers due to exposure to various hazards brought about by the construction activities, equipment traffic and migrant workers
- Potential conflict between migrant workers and local residents
- Construction waste management including domestic waste from workers, discarded or excess materials, and hazardous wastes items
- Temporary migration of wildlife

10. The amount of domestic wastes (i.e. wastewater and solid waste) will not be significant but these would require standard containment (i.e. septic tank, soak pit), collection and disposal (i.e. solid wastes to the landfill).

11. Long term impacts. Long term impacts includes possible land and soil degradation at the construction site and vicinities due to loss of vegetation, alteration of terrain due to excavation, compaction, construction spoils, litters and wastes. The improved irrigation water supply is also expected to promote intensive agricultural production in the service area thereby increasing use of pesticides.

12. Mitigation Measures: A detailed Environmental and Social Management Plan (ESMP) has been prepared and included in the ESIA Report. The specific mitigation measures are as follows:

- Requiring the contractor to undertake restoration of the top soil and landscaping of the unused portions of the 4,000 sq meter levelled mountain side, with trees and grasses
- Undertaking the construction only during the dry months, newly placed embankments and landfill should be immediately compacted and stockpiles should be placed away from runoff.
- Regular sprinkling of the ground in the excavation area, the routes to the landfill and to Hai San pit, as necessary throughout the construction period should be undertaken.
- Consulting the farmers on the exact timing of the cut-off with a lead time of at least one month
- Requiring the contractor as part of the contract, to undertake repairs and provide adequate detours, if necessary, along the routes and to restore any damage sustained by the routes after completion of the construction.
- To reduce health and safety risks for local residents, the contractor is also required to provide safe passageways for residents as well as barrier fences and warning signs in dangerous areas of the construction site; impose vehicular speed limits on residential areas; provide water and sanitation facilities at its campsite; undertake medical screening of its workers; and, strictly implements standard health and safety protocols for workers and maintain good community relations
- Regular collection of domestic garbage and hazardous waste and dispose them into the community landfill/garbage dump
- Imposition of ban of wildlife poaching and hunting among workers and avoidance of construction activities during night time
- Requiring the contractor undertake clearing and restoration of sites after completion of works;
- Introduction and promotion of the Integrated Pest Management approach among farmers in the area
- Adoption and setting up of Grievance Redress Mechanism. The GRM should be set up at prior to the start of construction
- Adoption of DRSIP Chance Find Procedure; and,
- Adoption of the Unexploded Ordnance Procedure.

13. Consultations: In the process to prepare the ESIA report for the Khe Che reservoirs improvement sub project, the two community consultation meetings were held. The first community consultation meeting conducted on January 31, 2015 at the Dong Trieu irrigation exploitation company. The second round consultation conducted from March 11, 2015. The participants include representatives of DARD, Department of Culture, DoNRE, Designer consultants and representatives of An Sinh and Viet Dan communes and community members. The result of community consultation reveals that 100%

participant consent with the project implementation. Local people and government are ready to support for the project implementation. The consultation also recorded some recommendation from community namely: The constructor and project owner should comply the right mitigation environmental and social measures; comply the labor safety requirements to prevent the risk for the local community and affect the rural infrastructure. The constructor needs to well manage their workers to ensure the public order in the project area. Based on the community recommendation, the project owners commit to comply the social and environmental mitigation measures proposed in the EISA and request the constructor to comply the labor safety requirements for worker and sanitation in the construction site; and request constructor are responsible to compensate for the local people if constructor break/ cause any lost to asset of local people.

14. Resettlement Action Plan (RAP): The implementation of Khe Che reservoir will acquire permanently 4000 m² of Forestry Company and acquire temporarily 1,000m² of public land managed by An Sinh commune. There is no HH affected land. The total cost is for RAP is VND 546,975,000. In which, 156,000,000 VND for land; 311,500,000 VND for trees/crops; 79,475,000 for management and contingency.

15. Ethnic Minority Development Plan: Tay Ethnic minority account for 91,8% (124 HHs) of the total Ethnic minority in the Sub - project area (135 HHs). All the EM households benefited from the project and do not bear negative impact due to project implementation. The consultation with EM in the FPIC manner shows that there is broad community support from EM peoples for the subproject implementation. Besides, based on the EM consultation result, the Sub project has designed the 3 development activities to bring more benefit for EM. These activities include: i) Training on sweet corn production; ii) Communication support; iii) Training on business development skills. The total budget of Development activities is 504,000,000 VND. EMDP will be further updated on the basis of the detailed design of the subproject.

16. Risk of dam broken failure: The dam failure of Khe Che reservoir will affect 8 communes and 1 town including: An Sinh commune, Binh Duong commune, Duc Chinh commune, Viet Dan commune, Tan Viet commune, Thuy An commune, Trang An commune, Nguyen Hue commune and Dong Trieu town of Dong Trieu district with estimation of effect: 11,464 households; 38,076 people; area of agriculture and aquaculture land: 4,298 ha; 39 historic and culture vestiges that have 4 historic vestiges in national-level vestiges; public works including: 09 People's Committee headquarters of communes, towns, schools, hospitals and clinics; affecting the highway 18, railway crossing region of districts, and a lot of district roads, inter-communal road.

17. Cost Estimate. The estimated cost of the subproject is **VND 53.271.995.161** (Equivalent to 2.536.762 USD). This includes about VND 881,199,000 estimated cost of ESMP implementation and compliance monitoring.

VI. Sub-project: Dong Be Dam rehabilitation and safety improvement, Thanh Hoa Province

1. Background: The Dong Be Dam rehabilitation and upgrading is one of the priority subprojects which was identified for implementation under the World Bank's fund for Dam Rehabilitation and Safety Improvement Project (DRSIP). This environmental and social impact assessment (ESIA) was conducted in compliance with the requirements of the World Bank's Environmental Assessment Policy and the Vietnam's Law on Environment Protection (LEP).

2. The Dong Be dam is located in Xuan Du commune, Nhu Thanh district, in Thanh Hoa province. It's about 40 km from Thanh Hoa city to the Southwest. It was built in 1989 and the last rehabilitation of the reservoir was done in 2003 with funding of Song Chu Irrigation Company. Its basin area is 9.4 km² and reservoir capacity is about 1.97 million m³. The headworks and its auxiliary structures include the following items:

- *Dam:* The dam was built of homogeneous soil with height of 10.95 m and length of 714.18 m. The dam crest elevation is 42.3 m with width of 5.0 m
- *Spillway:* It has a width of Btr = 50 m and made of reinforced concrete. It is connected to a dissipation basin.
- *Intake:* It is located at the right side of the dam. It is made of reinforced concrete and steel with thickness of Fi = 0.8 m. It is a circle culvert with an upstream control valve.
- *Management road:* The road consists of two sections: The first section which stretches from Road 506 to Dong Be Reservoir is asphalt pavement with carriage way of 3 m width and 200 meters long. Another road on the right side is made of earth with length of 100 m. The other section on the left side of main dam which stretches from Trieu Thanh junction to the dyke and spillway is an earth road with length of 700 m.

3. The dam is in poor condition: The dam has been operating for 25 years now and it is in poor condition due to there is no major repair carried out during its operation. After being put into operation, in May 1991, the water level in the reservoir was risen and 70cm higher than the floor of the spillway. Floodwater eroded the spillway chute, leakage through dam body and sluice. The entire residential areas in Đông Bún and Xuân Du was flooded. After that, an additional auxiliary dam was built at 300m from the right shoulder of the dam to reduce flood, repair the spillway with concrete. In 1996, 1997, the spillway was repaired again. In 2003, wave protection wall was built on the top of the dam, build the dam berm at downstream face at elevation (+38.00) m and drainage system. Along the length of the dam, there are much seepages. The rock fill in the upstream side is fragmented. About 80 m from the intake to the left the dam surface is sagging. The intake has a defective valve gate which is difficult to move and experiencing leaks. The concrete pipe culvert itself is already damaged and weakened by erosion. There is no management house for the intake operation currently. The concrete surface of the spillway is damaged partially with many dissipation ridges broken. In general, the structures that are still functioning are too old to be able to regulate water and guarantee safety. According to result of flood control modelling, the normal water level at 41.56 m and maximum water level of 42.3 m are higher than current dam crest from 0.16 m to 0.9 m.

4. There are approximately 500 people living at the downstream of the dam. It's also noted that 1000 ha agricultural land and a segment of the Provincial Road 506 are situated in downstream. The deteriorating condition of the dam is threatening the safety of people, their assets and infrastructure. In the recent years, due to the deteriorating condition of the reservoir, the water supply capacity has been reduced and it is adversely affecting the economic development of Xuan Du and Trieu Thanh communes.

5. Proposed repair and upgrading works. The proposed repair and upgrading works include: (a) treatment of seepage through body and foundation of dam; (b) eroded portions restoration; (c) replacement of the intake; (d) lengthening the spillway and building an overhead bridge; and, (e) upgrading management road. The project was designed and carried out in accordance with the Safety of Dam Policy of the World Bank (OP/BP 4.37) and in compliance regulations and standards of the Socialist Republic of Vietnam.

6. Environmental and Social Screening: The ESIA begun with the conduct of environmental and social screening to, among others, check any ineligible aspects of the proposed works and determine the scope of the assessment. Based on the Environmental and Social Screening, the subproject is eligible for financing under DRSIP. The subproject is classified in Category B according to the World Bank's classification. It is not located within or near any sensitive environment or natural habitat and there is no structure or site in the area of significance cultural and historical structures that will be impacted by the rehabilitation. There is not any ethnic minority affected by the subproject area. The rehabilitated dam is categorized as a small dam based on the World Bank Safety of Dam Policy classification.

7. Environmental and Social Impacts: The subproject will improve dam safety, protect downstream infrastructure as well as the lives and assets of local people at the downstream of the dam. The rehabilitated works will ensure stable and reliable supply of irrigation water for the 255 ha of rice field, upland crops and aquaculture ponds. It will also supplement the existing groundwater for domestic use of local people in dry season. However, there will be some negative social and environmental impacts as follows:

- *Loss of lands and crops* - A survey in the subproject area indicated that 0.57 hectare will be permanently acquired by the sub-project while 1.08 hectare will be temporarily used during construction. The lands which will be acquired are within the dam's protected area and belonged to Xuan Du Communal People's Committee (CPC). The trees and crops in the dam's reservation area are managed by the State. The temporary use of 1.08 hectares during construction will affect 13 households (78 persons) in Trieu Thanh commune of Trieu Son district and Xuan Du commune of Nhu Thanh district. No household (HH) will be relocated or economically displaced.
- *Land and soil degradation* - Soil and land degradation is possible within and around construction sites due to excavation, compaction, change landscape and drainage patterns as well as traditional access routes; litters and possible improper disposal of construction spoils and wastes; possible indirect impact on the use of pesticide due to intensification of agricultural production in the service areas; and
- *Impacts of construction activities* – Impacts of construction activities are significant but they are generally short-term and localized. These include:
 - o Increase concentration of particulate matter (mostly dust)
 - o Noise exceeds the limit due to equipment operation
 - o Increased sediment and turbidity of surface water due to excavation, especially at the borrow pits
 - o Traffic disruptions
 - o Damage existing roads by the heavy equipment's movement; and,
 - o Increase the risk of health and safety for the workers and local people due to unexpected incidents at the project area.
- The air emissions of equipment and vehicles are deemed not significant. The wastewater and solid waste which are generated by workers are also unremarkable but it would require a standard collection system and disposal such as septic tank and/or soak pit and solid waste collection and disposal system.
- *Other issues* – There is a possibility of encountering unexploded ordnance leftover from the war or of finding archaeological artifacts during excavations. There may also be complaints or claims of accidental damage from the sub-project.

8. Mitigation measures – The Social Environmental Management Plan proposed specific measures to mitigate the identified potential impacts. Interruption to irrigation will be avoided by sitting a new

water intake instead of just replacing the sluice, optimizing construction schedule and build coffer dam to avoid unnecessary lowering of water in the reservoir. Other construction impacts would be mitigated by readily known mitigation measures that would be implemented by the contractor as part of construction practice such as covering truck and watering dusty roads, collection and management of construction sites to prevent spreading of water and wastewater, placing signboards to limit traffic speed, requesting the contractors to provide adequate accommodation with adequate water supply and sanitation facilities for the workers to use. These mitigation measures will be incorporated into construction the bidding document and contract in the form of Environmental Specifications.

9. Consultations: The consultant cooperated with the Project owner to organize community consultations in 2 times. The first consultations were organized on 18 February, 2015 at Trieu Thanh CPC with 40 participants including representatives of district, provincial agencies, and 4 communes in the subproject area to inform about the subproject, consult for support of subproject implementation and determine scope and impact of subproject. The second consultations were organized from 17 to 20 of March, 2015 at the CPC offices of Phuong Nghi, Hop Thanh, Xuan Du, Trieu Thanh communes with 30 to 40 participants of each including local authorities and social organizations, village heads and representatives of affected households to inform about the negative effects of the subproject on the environment, society and mitigation measures. Consequently, 100% of participants agreed to implement subproject and proposed mitigation measures. In addition, affected people gave recommendations that: i) construction activities must be carried out quickly and completed each component before going on with the next components; ii) during construction, contractors and project owner need to receive feedback from the community to make appropriate modifications; iii) people want the project to support for rehabilitation, dredging of canals connected to Dong Be reservoir to ensure irrigation; iv) to support training courses on agriculture, business and communication in local area; v) PPMU and contractors strictly implement measures to minimize environmental impact. The project owner was receptive and committed to implement.

10. Resettlement Action Plan (RAP): The implementation of Dong Be Subproject, Thanh Hoa province will permanently acquire 5,705m² and temporarily acquire withdrawal 10,815m². There will be 13 households, including 78 people, with trees and crops on the dam safety area will be affected by Subproject. These land were used for purposes of agriculture, forestation and aquaculture. Total cost estimate of compensation and support is 654,672,500 (VND) including land compensation cost of 298,672,500 (VND); management costs and contingency of 356,000,000 (VND).

11. Ethnic Minority Development Plan: In the Subproject area, proportions of ethnic minority (EM) peoples are 28.97% of Muong, 2.97% of Thai and 0.83% of others. There is no EM person in the 13 households affected by land acquisition. According to consultation with ethnic minorities, there is broad support of EM community for implementation of Subproject. The development activities under Ethnic Minority Development Plan include supports for training on agricultural extension, business and communication program. Total cost estimate of EMDP is 431,250,000 (VND). EMDP will be further updated on the basis of the detailed design of the subproject.

12. Risk of dam broken failure: Dong Be dam break will affect Xuan Du and Trieu Thanh commune, with total of 100 households, including 500 people, 15 km of asphalt and concrete road, 7 irrigation canals; 11 schools; 4 health care centers; 4 CPC office buildings. Affected land area including: 255 ha agricultural land; 3,051.9 ha forestry land and 107.46 ha aquaculture land.

13. Budget allocation: The estimated cost of the implementation of the ESMP, including monitoring activities is 1,396,000,000 VND. The total estimated cost of the sub-project including the implementation of the ESMP is **81,168,197,500 VND**.

VII. Subproject: Repair and Improvement of Khe San Reservoir, Nghe An Province

1. The “Rehabilitation of Khe San Dam and Reservoir” is one of the sub-projects being proposed for funding under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). The objectives of the subproject are: (i) to ensure the long term viability of the dam and reservoir; (ii) to ensure the safety of 1,800 people within the immediate downstream of the dam and the protection of 650 ha of agricultural and natural area, and downstream infrastructures particularly community buildings; (iii) to ensure stable water source for irrigation of 120 ha of rice and animal production. This environmental and social impact assessment (ESIA) was undertaken to comply with the World Bank's Environmental Assessment Policy and the Vietnam's Law on Environment Protection.

2. Khe San reservoir is located in Quynh Thang commune, 80km far from Nghe An city in the south. The reservoir was built in 1980. The catchment area of the reservoir is of 5.2 km², water storage capacity is of 1.47x10⁶ m³. The headwork cluster and auxiliary works (current condition) of the Khe San reservoir consist of following categories:

- *Dam*: It is homogeneous earth dam, crest length is 320 m. Dam crest is at 46m; width of 2.6-3.2m
- *Spillway*: It is an earth and broad-crested free spillway. The width of principal chute spillway: 23.6m, elevation of spillway: 45.3m.
- *Water intake*: Diameter of Water intake is 80cm (D80cm), Upstream elevation of water intake: 33.63m, Downstream elevation of water intake: 33.05m
- *Management and operation road*: It is Earthen road, Length: 145.8m, Width: 1.0-1.5m, Steep and difficult to walk during rainy season

3. The current state of the dam does not guarantee safety. Over the 35 years, the earth dam has degraded with dam face now substantially reduced and crest height becoming uneven. The construction of this dam is of low quality with a crude trench that resulted in infiltration of water through the body and foundation of dam. The protective layer of quarry stone on the upstream face has been slipping while the protective layer of grass graft downstream face has been severely eroded. Moreover, the earth spillway which lies on the right side of the dam (100m from dam) has also been eroded and damaged, especially towards the side of the contiguous abutment and the downstream spillway. There is currently no management house/office on site or duly trained dam management staff. There is also no operating procedures and plans for flood prevention or emergency preparedness plan (EPP).

4. There are about 1,800 people within the immediate downstream of the reservoir, producing rice on 650 ha of land. A provincial road (598) pass through the area and serve as the life-line connecting the north of Nghe An with to the districts (Quynh Luu). The deteriorating condition of the dam also threatens the safety of these infrastructure as well as the lives and assets of downstream communities. In the recent years, due to the deteriorating condition of the reservoir, the water supply capacity has been reduced, adversely affecting the economic development of Quynh Thang Commune.

5. Rehabilitation and Upgrading Works: The proposed repair and upgrading works are based on the recommendations of the Dam Safety Assessment conducted on the dam. These include: the repair and upgrading of the dam body and foundation, reinforcement of the spillway, replacement of the water intake, construction of a small 90m² floor area management house, and the rehabilitation and upgrading of the existing management road. Sufficiently detailed plans for the sub-project repair works and their implementation have been prepared and served as the basis for this ESIA.

6. Environmental and Social Screening: Based on the Environmental and Social Screening, the sub-project is eligible for financing under DRSIP. The subproject is a Category B under the World Bank's classification. It is not located within or near any sensitive environment or natural habitat and there are no structures or sites in the area of cultural and historical significance that will be impacted by the rehabilitation. There are also no ethnic minorities in the area. The dam to be rehabilitated is by definition a small dam.

7. Environmental and Social Impacts: The sub-project when implemented will improve dam safety, protecting downstream infrastructure and the lives and assets of local people downstream of the dam. The repair and rehabilitation works will also ensure stable and reliable supply of irrigation water for the 120 ha of rice paddies, vegetables plots and aquaculture ponds, and supplement the existing groundwater source for domestic use of local people in dry season. However, there will also be some negative social and environmental impacts. These include: (i) loss of land, assets, crops and economic trees due to land and temporary construction easement requirements of the sub-project; (ii) likely interruptions in irrigation service during the dam repair which would affect crop production; and, (iii) other temporary impacts associated with construction activities.

8. A survey of the area indicates that about 1.42 hectare will be permanently used by the sub-project and about 1.0 hectare will be temporarily used during construction (The land is owned by the People's Committee of the Quynh Thang Commune). Portions of these lands are currently planted with perennial crops and commercial trees while the rest are covered with shrubs and low value trees. The use of land by the sub-project requires to displace a house and asset of **01 household**. The households currently using the land will be compensated and supported sufficiently to comply with the DRSIP Resettlement Policy Framework (RPF) through a Resettlement Action Plan/Compensation Plan. The planned rehabilitation works will not affect any religious, cultural or historical structure such as graves, temple and/or monuments.

9. The other impacts associated with construction activities include: possible land degradation within the vicinities of the construction and quarry sites due construction spoils, boulders, materials and rubbish; increased concentration of particulate matter (mostly dust); elevated noise; increased sedimentation and turbidity of surface water; traffic disruptions; and, a slight increase in health and safety risks for the workers and local population due to exposure to hazards at construction site.

10. Mitigation Measures – An Environmental Management Plan (ESMP) has been developed as part of this ESIA to address these impacts. The ESMP requires the adoption/implementation of the various other safeguards instruments which have been prepared for the sub-project such as, the Resettlement Action Plan/Compensation Plan, the Communication Plan, the Gender Action Plan, the Grievance Redress Procedure, the Chance Find Procedure, and the Unexploded Ordinance Procedure. Specific measures in the ESMP include, close consultation with the affected farmers for the optimal scheduling and timing of construction activities to minimize cropping disruptions, proper housekeeping at the construction site, disposal of construction spoils to a properly sited landfill, regular sprinkling of roads in residential areas during dry days, and the preparation and submission by the Contractor of its own Environmental and Occupational Health and Safety Plan for the construction site, incorporating construction-related measures and standard construction EHS practices such as wearing of PPEs, provision of adequate water and sanitation facilities at campsite, medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations. The ESMP also requires the installation of a capacitated Dam Management Unit and the preparation of Emergency Preparedness Plan as recommended in the Dam Safety Assessment Report.

11. Consultation: Consultation meeting was held a Quynh Thang cooperative office, Quynh Thang commune in March 02, 2015 with 50 participants. The participant included representative of Commune People's Committee, Fatherland Front Board, social organizations, the affected households and local people in project area. Environmental impact assessment consultation: Request PPMU applies measures and regulation on penalizing or terminating unilaterally with contractor, supervision unit if they do not obey adequate safety measures and timely propose environmental protection measures. Require the contractor must be committed to minimize the adverse impacts as per presents in Environmental and Social management and Monitoring plan. Social impact assessment consultation: The affected households want to be compensated adequately and manifestly according to the replaceable price for damaged assets and the market price for temporary affected farming products. Proposing PPMU coordinates with consultant unit to organize times for disseminating information relating to subproject, propagandize for the local to understand the purpose as well as the benefits of subproject. The subproject's works must be done quickly and to be fished one by one before changing to the other items. Contractor and project owner are required to listen attentively the feedback from

community to have corresponding reform. The ideas from community must be sent to organizations. Community supervision board. Commune People's Committee. PPMU and relevant organizations.

12. Resettlement Action Plan (RAP): The construction of the sub-project will acquire land and assets on land owned by 03HHs in Quynh Thang commune, Quynh Luu district, Nghe An province for construction, in which (i) 2,000m² residential land of 01HH (ii) 12,200m² perennial trees of 02 HHs, (ii) 10,000m² temporarily acquired land managed by the CPC. Land to be acquired: Permanently acquired land: (i)) acquire 2000m² residential land of 01 HH and (ii)) 02 acquire 12,200m² land of perennial trees of 02 HHs; Temporarily acquired land: temporarily acquire 10,000m² managed by the CPC for construction. Loss of assets on land: Trees: land of 11,000 kinds of trees including Acacia, and Eucalyptus owned by 02 HHs. Building/ Structure: There is 01 HH affected (Mr Pham Ngoc Gia) with its house and has to relocate. Total cost of compensation, support and resettlement for the sub-project is VND 2,183,506,000 equivalent to \$USD 103,976.

13. Risk of dam broken failure: If the dam is broken, the losses of lives and property of the people are immeasurable because currently the following infrastructures are protected by the Khe San dam: 123.26 km of access road, 6.8 km of canal route, 3 schools, 1 health centre, 1 administrative office, 6 transformer stations, 53.6km electric lines, there are about 1,800 people within the immediate downstream of the Khe San reservoir, producing rice on 650 ha of land and a provincial road (NO 598) pass through the area and serve as the life-line connecting the north of Nghe An with to the districts (Quynh Luu).

14. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. The total estimated cost of the sub-project including implementation of the ESMP is VND 42,263,543,000 equivalent to US\$ 2.012million. The environmental monitoring costs VND 275,474,000 and VND 202,204,000 (equivalent to US\$ 13,117 and US\$ 9,629) for construction and operation phase respectively. The estimated training budget is VND 28,000,000 (USD 1,300).

VIII. Sub-project: the Repair and Rehabilitation of Phu Vinh Dam, Quang Binh province

1. Background: The Repair and Rehabilitation of Phu Vinh Dam is one of the 12 sub-projects identified for the funding during the first year implementation of the World Bank-funded Vietnam Dam Rehabilitation and Safety Improvement Project (DRSIP). Phu Vinh reservoir is located in Thuan Duc commune and Dong Son ward, 7km from Dong Hoi city in the West. The reservoir was built in 1992 and has not been repaired or upgraded. The catchment area of the reservoir is 38 km², water storage capacity is approximately 22 millions cubic meters at normal water level. The headworks and auxiliary works of the Phu Vinh reservoir consist of the following:

- *Main Dam:* it is a homogeneous earth dam with the maximum height of 27.6m, length of 1776 m. DamCrest elevation is at + 24.2m; width is 5.0m
- *Left auxiliary dam:* A homogeneous earth dam with the maximum height of 28.8m, length of 1259 m. Crest elevation is at + 25.4m; width of 6.0m
- *Right auxiliary dam:* A homogeneous earth dam with the maximum height of 28.9m, length of 400 m. Crest elevation is at + 25.5m; width of 5.0m
- *Spillway:* Spillway width Btr = 18.0m; covered by reinforced concrete; with chute and energy-relief tank; $Q_{x1\%} = 380\text{m}^3/\text{s}$.
- *Outlet works:* a reinforced concrete structure, located on the left side of the main dam; dimension B × H = 1.2×1.6 m. It is box sewer with regulator tower gate in upstream

2. Due to long time operation, the construction has seriously degraded. The recorded problems includes: (i) Upstream surface of the main dam has been degraded and sunken at many sections, creating many concave-convex areas and even some parts have been peeled off; (ii) downstream water drain ditches are degraded and damaged at many sections; (iii) Outlet works are leaked, pressured open/close motor is degraded, poses the danger in operation. That is a main reason why outlet works don't gain the original design water volume and don't supply enough water for irrigation areas. Concrete layers of inlet body are peeled and calcified. Therefore, it is necessary to build a new outlet works; and (iv) Spillway: stream directing wall has cracked and broken; some points on concrete ramp have stripped; flip lips to emergency valve have been damaged severely. Although several facilities had been reinforced, but many items from the work have been degraded, water reservation capability is low, and unsafely during the operation process may happen. If the dam is failed in flood season, the lives of people and existing infrastructures in the socio-economic centre of Quảng Bình province would be destroyed.

3. Description of the project: The main purposes of rehabilitation and upgrading are: (i) to ensure the safety and stability of the dam and reservoir; (ii) to enhance the flood-prevention function of the dam for the city of Dong Hoi; and (iii) to supply irrigation water to the 1672-ha agricultural land and domestic water to the people of Dong Hoi city at a capacity of 18,000 m³/day.

The proposed structural works include: (i) repair and rehabilitation of the main dam expand the dam crest width from 5 to 6 m, raise the height 0.8 m, crest elevation will be changed from 24.2 to 25 m, replace weathered materials and broken lining layer of dam faces, build drainage systems for dam faces etc.; (ii) construction of a new inlet structure; (iii) the repair and strengthening of the the main channel with reinforced concrete; (iv) the rehabilitation of the lifting system and bulk heads of the spillway; and, (v) the installation of a new lighting system on the top of the main dam.

4. Environmental and Social Screening. There are no critical natural habitats near the dam and the area is not known to living habitat for any rare or endangered species. The local population is 100% Kinh people which is the mainstream ethnic linguistic group in Vietnam. The Dam is categorized as large dam and therefore subjected to review by a Panel of Expert. There are no grave, temple or any culture, belief, religious structures affected in the project area. The repair works will use a total of 6.78 ha of lands, about 1.2 hectares of which belong to private households; hence a Resettlement Action/Compensation Plan (RAP) was required. The sub-project is a Environmental Category A as per World Bank OP/BP 4.01.

4. Environmental and Social Impacts. The subproject will bring in considerable benefits to local community, such as: (i) a stable and reliable irrigation and domestic water supply; (ii) improved dam safety, protecting infrastructure, lives, livelihood and property downstream of the dam; and, (iii) improved landscape in the dam headworks area. The following are the negative impacts:

6. Loss of lands and crops - The land acquisition will affect seven (7) households who will lose a total of 1.2 hectares of agricultural land. No houses or residential lots will be affected. The affected households will be compensated and supported sufficiently in accordance with the RAP which was prepared in accordance with the World Bank Involuntary Resettlement Policy (OP/BP 4.12).

7. Impacts of construction activities – The repair works will involve significant excavation (176,000 m³) and embankment filling works (18,500 m³). An existing burrow pit/ embankment material source within 2 km from the dam has been identified to serve the sub-project needs. Surplus excavated materials and construction spoils will be dumped in a designated disposal area about 1.5 km from the site. About 40 workers will be mobilized at the peak of construction activities. The impacts of these activities would likely include the following:

- Temporary increased in sedimentation of the waterways during rainy days due to earthmoving activities
- Increase in dusts, nuisance within the construction site and along construction routes
- Increase in noise levels within the construction site
- Possible interruption in water supply during the repair works
- Possible damage of existing roadways due to heavy equipment traffic particularly the hauling of embankment materials
- Increase health and safety risks among local residents near the dam and along construction routes due to exposure to construction-related hazards; and,
- Occupation health and safety concerns for the workers.
- Increase of fertilizer and pesticide due to rehabilitated of irrigation area from 1,672ha up to 2,825ha (up by 1,153ha) during operation phase.
- Possible downstream impacts related to the increased designed water column at the spillway.

The amount of domestic wastes (i.e. wastewater and solid waste) will not be significant (solid waste: 6–20kg per day; waste water is 8.42 m³/day) but these would require standard containment (i.e. septic tank, soak pit), collection and disposal (i.e. solid wastes to the landfill).

8. Long term impacts - The rehabilitation will result in additional irrigation coverage of about 1,153 hectares. The new irrigated areas will cover only existing agricultural lands and will not come from new forest clearings. However, the new irrigation areas will likely increase paddy rice and vegetable cultivation, resulting in increase use of pesticide and agrochemicals. Other impacts are the possible soil and land degradation (i.e. reduced suitability for agricultural production and change in landscape) of the lands around the construction sites and those used for temporary facilities and easements due to compaction, litters and deformation. There will be no new area to be inundated by the reservoir. While the dam crest height will be increased by about 0.8m, the effective height of the spillway will remain the same and hence the original designed capacity of the reservoir will remain the same.

9. Mitigation Measures: A detailed Environmental and Social Management Plan (ESMP) has been prepared and included in the ESIA Report. A RAP has also been developed in consultation with the affected household to address loss of land and crops. The specific mitigation measures are as follows:

- To minimize sedimentation, the contractor is required to strictly use of designated burrow pit for the extraction of embankment materials and dispose excess materials to the designated landfill. Stockpiles of soil and sand materials should be placed away from waterways and runoff or provided with perimeter silt traps.
- To address dusts nuisance, the contractor is required to sprinkle water on affected areas at construction sites and along routes during dry days
- To minimize nuisance from noise levels, construction activities shall be avoided during the

- night times
- Cofferdam will be used during construction of the new inlet to avoid draining the reservoir.
- The contractor shall be required to undertake the necessary repairs of the construction routes, including provision of temporary detours round weak bridges
- OP/4.09 will be considered to enable for this sub-project to mitigate these impacts. An Integrated Pest Management will be done for this sub-project.
- To reduced health and safety risks for local residents, the contractor is also required to provide safe passageways for residents as well as barrier fences and warning signs in dangerous areas of the construction site; impose vehicular speed limits on residential areas; provide water and sanitation facilities at its campsite; undertake medical screening of its workers; and, strictly implements standard health and safety protocols for workers.
- To address possible land and soil degradation, the contractor is required to practice good housekeeping at construction sites, proper disposal of construction spoils, and clearing and restoration of sites upon completion of the construction.

To ensure that contractor can be held accountable for these measures, it will be required to submit its own Contractors Environmental and Occupation Health and Safety Plan adopting the above measures along with standard construction housekeeping and health and safety practices. To address possible long term increase in use of pesticide, the MARD/DARD will introduce and promote the Integrated Pest Management approach in the areas covered by the irrigation services.

10. Consultation: In ESIA preparation, 02 community consultations were carried out: (1) Consultant for the sub-project preparation from March 02-04, 2015; and (2) Consultation about measures to minimize the environment and social impacts of subproject from March 24-26, 2015. Participants include representatives of Affected & Benefited Households, DARD, DoNRE, Quang Binh Irrigation Construction Company, Consultant and CPC. During the consultations, the local communities expressed full consensus and support for the sub-project implementation while the sub-project owner has committed to follow the proposed mitigation measures mentioned in the ESIA. It also committed to coordinate with local authority to manage workers on site and reduce conflict between worker and local residents, reduce traffic accidents following the sub-project Environmental Specifications. In addition, PAPs also recommend: (1) Ensure to fully and satisfyingly compensate for affected people; (2) The measure of loss has to be conducted transparently, clearly and accurately; (3) Do not work over night; (4) Only used truck with loading under 6 tonnes; (5) If rural roads are damaged, constructor must repair as before subproject; (6) Protect against pollution of the reservoir because it is supported for irrigation and domestic water for Dong Hoi city; (7) Ensure environmental sanitation during subprojects implementation; (8) Investor have to do mitigation measures as in the ESIA report. The project owner ensured to implement all above recommendations.

11. Resettlement action plan (RAP): The land acquisition will acquire 67,805 m² of land, of which 12,179 m² owned by seven households in Dong Son ward and 55,626 m² is the land within safety corridor which is being managed by Phu Vinh reservoir operation unit. There are 24 HHs having total 11,673m² of rice field land affected and vegetation as gum trees, acacia plants, jackfruit tree... No houses or residential lots will be affected. The affected households will be compensated and supported sufficiently in accordance with the RAP which was prepared in accordance with the World Bank Involuntary Resettlement Policy (OP/BP 4.12). The total costs for compensation, assistance and resettlement for this subproject is approximately 1,360,704,000 VND, in which: Compensation cost is 409,070,254 VND; Assistance cost is 805,844,000 VND; Implementation cost is 24,298,285 VND; Contingencies cost is 121,491,425 VND.

12. Risk of dam broken failure: in case of dam failure, houses, lives and properties of 230 households, 3,650 people living at 600-700 away from dam toe would be affected directly; almost 1,672 ha of crops would be destroy. Infrastructure would be damaged or seriously affected: 87km concrete road, 3km irrigation canals, 09 schools, 02 clinics and one domestic water supply unit. The most affected region are Dong Son ward, Thuan Duc commune and Bac Nghia ward. Dong Hoi city is only inundated because it is far from the reservoir;

13. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is: **110,052,924,000 VND**. Budget for ESMP implementation including

- Environmental monitoring (VND 560,000,000, or approximately 25,900 USD, main for meeting environmental monitoring requirements of the Government of Vietnam)
- Capacity building (VND 220,000,000, or 10,200 USD)
- IPM Training (VND 120,000,000, or 5,600 USD)

IX. Subproject: Repair and Upgrade of Dap Lang Reservoir in the Quang Ngai Province

1. Background. The “Repair and Upgrade of Dap Lang Reservoir in the Quang Ngai Province” is one of the subprojects being considered for priority funding under the Dam Rehabilitation and Safety Improvement Project (DRSIP), a World Bank-assisted project. An Environmental and Social Impact Assessment was conducted in order to comply with the requirements of the World Bank Environmental Assessment Policy (OP/BP 4.01) and the Vietnam Law of Environmental Protection (LEP).

2. Dap Lang Reservoir is located in Commune of Nghia Hanh District of Quang Ngai Province. The dam has a crest height of 13.1 m and a reservoir capacity of 0.41 million cubic meters. It was built in 1978. The reservoir serves as irrigation water source for about 80 ha of agricultural land. There are about 346 households living in downstream of the dam. The existing headworks consist of the following structures:

- Total volume of the reservoir: 0.41 million m³
- Dam: An earth dam with length of 135 m and max of dam height of 13.1 m
- Spillway: The flood spillway is made of concrete and operated by free overflow mechanism.
- Water Intake: The intake is a culvert combined with flow-controlled equipment made of steel pipe inside concrete pipe D500. It has an open-close valve downstream.
- The irrigational area: 83 ha (< 200 ha)

3. For over 37 years now the dam has not undergone major repair, leaving the structure in a state of degradation. Because of this, the safety of the dam can no longer be guaranteed and the reservoir can no longer meet its designed capacity. The dam has sustained serious damaged at the focal complex. On the downstream slope, there is the existence of 3 seepage points. At the time of survey, water level at the elevation of 26.0m, 2.8m lower than 28.8m NRWL even though it is just at the end of flood season. Seepage is strong and the culvert cannot close valve gate, leading to quick water loss in the reservoir. The reservoir can only provide water for 60 ha of agricultural land downstream. However, even this capacity is hard to meet during dry season because the integrity of the earth dam body is already compromised with lots of leakages and infiltration. The width of flood spillway is enough but its height is too low to meet the original designed capacity. In 1999, large flood occurred, damaging the whole reinforcement structure for downstream discharge canal. Currently, the downstream discharge canal has still not been invested and repaired, leading to deep erosion behind the dissipater and destabilize the walls and bottom of the dissipater. The water intake culvert is made of concrete, 80 cm thick and free flowing but it is not closed causing water loss and erosion on both sides.

4. The proposed repair works: The sub-project activities will include:

- Expansion of the length of dam from 135.0 m to 151.5 m
- Increasing the dam crest height from 30.8m to 32.5 m without altering capacity of the reservoir
- Extension of the dam surface from 3m to 6m and fixing the water infiltration in dam foundation and body
- Reinforcement of the spillway and increasing overflow length from 88m to 177m, retain the overflow threshold level of 28.8m and the overflow width of 20m
- Construction of new 66m offtake (length of current drain is 40m) and replacing the D800 culvert by reinforced D400
- Construction of a management house of level IV with area of 42m²; and,
- Concreting of the 0.7km stretch of the Management Road.

5. These repair and upgrading works have been identified based on the Dam Safety Assessment conducted as part of the DRSIP preparation. The works are designed and its implementation will be in accordance with the World Bank Safety of Dam Policy (OP/BP 4.37) as well as the national dam standards and criteria of Vietnam.

6. Environmental and Social Screening. The subproject underwent mandatory environmental and social screening as agreed with the World Bank, to among others, determine any ineligible activities from the safeguards policies point of view and determine the scope of the assessment. The results of the screening indicate that the subproject will not result in increase of the designed water storage capacity of the dam. No ethnic minority households are affected. There are no graves, temples or any structure or sites with cultural, religious or historical significance in the construction sites. The proposed civil works falls under the World Bank Environment Category B while the dam is considered “small” based on the World Bank classification. There are no critical natural habitats or protected areas of natural habitats in the area and there are no species in the rare and endangered lists in the area.

7. Social and Environmental Impacts: The subproject will provide benefits to the local communities in the form of stable and reliable water supply and improved safety. However, there are also negative impacts and issues that need to be addressed. The following are the impacts and issues considered significant and would need to be mitigated:

- Loss of land - The subproject requires acquisition of a total land area of 13,778 m² of agricultural and tree cropland. In addition about 39,875 m² of land in Tan Phu 2 Village will be used for temporary purposes. These lands are currently occupied by 23 households. No household would need to be relocated. The affected households will be compensated and fully supported through the Resettlement Action Plan (RAP) which was prepared in consultation with them.
- Construction Impacts – The volume of backfilling soil is estimated at 40,241m³. This is expected to come from three places which have a total capacity of 37,125 m³. The excavation requirement would be 34,415 m³. Surplus excavated soil which are unusable for embankment will be dumped in the designated landfill with area of 2.750m². Construction stone will be purchased from An Hoi stone mine which is about 27 km from the construction site; sand and gravel will be taken from the Cong Hoa Bridge, at Ve River, 7km away. Other materials will be purchased from Quang Ngai city, 26km from work site. There will be about 80 workers during the peak of construction and approximately 27 units of construction equipment will be mobilized. Based on this scale of construction, the following has been identified as significant impacts:
 - Temporary increase in sedimentation of the waterways during rainy days due to earthmoving activities.
 - Increase in dusts nuisance within the construction sites
 - Increase in noise levels within the construction site
 - Interruption in water supply during the repair works affecting agricultural production in irrigation service areas: There will not have sources of water supplying for the production area of rural farmland of Tan Phu 1 villages and Tan Phu 2 villages in the time of construction. Thus, with the area of 431,920 m² of paddy land will not be able to produce in 1 crop time autumn - summer of 266 households.
 - Increase health and safety risks among local residents near the dam and along construction routes due to exposure to construction-related hazards;
 - Domestic and hazardous waste - The amount of domestic wastes (i.e. wastewater and solid waste based on a peak of 80 workers) will be significant. These would require adoption of a comprehensive housekeeping and waste management system by the contractor. Standard waste containment and treatment measures (i.e. septic tank, soak pit), regular collection and disposal (i.e. solid wastes to the landfill). Hazardous materials will also require imposition of standards industry practice of storage and containment in case of spillage.
 - Long term impacts – The following are long term negative impacts, expected to be felt beyond the completion of the subproject.
 - Land and soil degradation – This could occur at the construction sites and vicinities due to loss of vegetation, alteration of landscape due to excavation, compaction, construction spoils, litters and wastes.

- Increased use of pesticides - The improved irrigation water supply is also expected to promote intensive agricultural production in the service area thereby increasing use of pesticides.

8. Mitigation Measures. To address these impacts, an Environmental Management Plan (ESMP) has been prepared as part of this ESIA report. A separate Resettlement Action/ Compensation Plan (RAP) has been prepared to address the impact of land acquisition. The specific measures in the ESMP are as follows:

- Implementation of the RAP
- Careful and optimal scheduling of construction activities to coincide with fallow periods, in close consultation with the affected farmers to minimize cropping disruptions.
- Imposition of good housekeeping practices at the construction site in terms of storage of materials, disposal of construction spoils to the designated landfill, regular sprinkling of roads in residential areas during dry days. All these to be incorporated in Contractor's own Environmental and Occupational Health and Safety Plan (CEOHSP) together with standard construction EHS practices such as wearing of PPEs, provision of adequate water and sanitation facilities at campsite, waste management including domestic wastewater and hazardous waste, medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations. Compliance with the relevant environmental protection criteria should also be included in the plan.
- Requiring the contractor to undertake site clearing, cleaning and restoration after completion of works, including the levelling of stockpiled surface soils in the burrow pit area and returning the ground for people to continue farming.
- Introduction and promotion by MARD of the Integrated Pest Management (IPM) technologies and approaches among the farming communities within the irrigation service areas.
- Constant communication and consultation with the stakeholders during construction to apprise them of the status and progress and also to hear complaints and problems;
- Adoption and setting up of Grievance Redress Mechanism; and,
- Adoption of Chance Find Procedure and Unexploded Ordnance Procedure.

9. Consultation: In the process to prepare the ESIA report, the consultant in closely cooperated with PMU have conducted 02 community consultation meetings, namely: (1) Community consultation for the project preparation conducted from February 05-07, 2015 at PPMU Quang Ngai, and (2) Community consultation on the Environmental and Social mitigation measures conducted from March 16-18, 2015 at Hanh Tin Tay commune. The participants include representatives of DARD, Department of Culture, DoNRE, Designer consultants and representatives of Hanh Tin Tay commune, representative of community such as village leaders, community members of 3 villages: Tan Phu 1, Tan Phu 2 and Tan Hoa. The results of community consultation show that there is broad community and local government support for the project implementation. Besides, there are some recommendations from community such as: The constructor and project owner should comply the right mitigation environmental and social measures; apply the relevant compensation policy for 23 HHs whose land lost; and 266 HH affected by water interruption during the culvert upgrading; Based on the recommendations from the community, the project owner commit to comply fully the Environmental and social mitigation measures as proposed in the ESIA and apply the update compensation policy of the province and WB's policy. Besides, project owner has committed to closely cooperate with local government to manage the migrated workers and the sanitation condition on the camp site and construction site. Project owner will ensure that the contractor complies the labor safety requirements to prevent risk to the community.

10. Resettlement action plan (RAP): The implementation of Dap Lang reservoir will acquire permanently 13,778 m² and temporary acquired 39,875 m² of 23 HHs (118 people). Besides, there are 266 HHs in the downstream will be affected by water interruption during the time of culvert repairing with the total affected area is one –season paddy 43,2ha. The total estimation cost for compensation, supporting to resettlement is 2,627,298,000 VND in which compensation cost is VND 979,652,000; the supporting cost is 1,304,955,220 VND that include: (cost to support for occupation change and job creation, cost to support HH due to water interruption) and contingency is 342,691,083 VND;

11. Risk of dam broken failure: In the event of Lang reservoir failure, it will affect total infrastructures systems and people in the downstream. Specifically: There are about 346HHs or 1370 people of 3 villages Tan Hoa, Tan Phu 1 and Tan Phu 2 of Hanh Tin Tay commue; 26km rural road; 12 km of irrigation canal, 02 transformer station, 15 km electricity line; 02 village meeting halls; 03 administrative offices, 01 health station, 03 schools, 160 ha agricultural land, 30 ha forestry land; 12,9 ha aquaculture.

12. Cost Estimate: The sub-projects use ODA funding and in-kind fund of the Government of Vietnam. The total investment costs is VND 36,645,376,000 (1,745,017.9 USD) of which VND 3,445,325,000 (164 063 USD) is the cost of the ESMP, including the RAP, monitoring and capacity building.

X. Subproject: *Repair and Improvement of Thach Ban Reservoir, Binh Dinh Province*

1. **Background.** The “*Repair and Improvement of Thach Ban Reservoir, Binh Dinh Province*” is one of the sub-projects being considered for first year implementation under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). An Environmental and Social Impact Assessment (ESIA) was undertaken on the subproject in order to comply with the requirements of the World Bank's Safeguard Policy and the Vietnam's Law of Environment Protection 2015 (LEP-2015).

2. Thach Ban reservoir is located in Thach Ban Dong-Cat Son commune- Phu Cat district, Binh Dinh Province. It is 7.5 km from the national highway in the West and 40 km to Qui Nhon City in the North. The reservoir was built in 1978 with a designed water storage capacity of 772,000m³. The catchment's area of the reservoir is of 3.0km². The reservoir is designed and rated as Level II under the Vietnam dam classification. The headwork cluster and auxiliary works of Thach Ban reservoir consist of the following main components:

- *Dam:* It is homogeneous earth dam with height of 12.1 m and crest elevation at +52.50m. The length and width of the dam crest are 897 m and 4.0m, respectively.
- *Spillway:* Principal spillway with B=30m with a 50m chute and a rip rap stilling basin
- *Outlet works:* It was built in 1990; the location is on the middle of the embankment, at elevation +43.50m and made of reinforced concrete structure. It is box sewer with regulator tower gate in downstream slope
- *Access and management road:* Route to the dam from Son Loc bridge, current width is of 2.5m; length L = 845.4m. It is earth filled, is slippery in rainy season and difficult to travel.

3. **The existing conditions do not ensure safety.** Due to long time use, the construction has seriously deteriorated. The problems include: (i) the gully erosion at the downstream slope; (ii) water seepage through the embankment; (iii) serious damage at the left and right abutment and the main structure; (iv) the upper stream slope of the dam has been deformed and localised erosion on the top of the dam made dam narrowed; (v) sedimentation of the stilling basin; (vi) the outlet is not working and causing water lost, the valve to control water flow has been corroded and difficult to operate; and, (vi) the 845.4 m earthen access and management road (2.5m wide) is difficult to travel and slippery in rainy season. Some sections on the top of the dam are at not at designed elevations but vary between +52.50m to 52.90m. Dam surface has been eroded with many traversed cracks. The thickness of the dam at its top has been narrowed down due to erosion and material degradation. Although several items had been reinforced, many items of the work have been degraded, capability to store water is low, and there is safety risk during operation.

4. **Sub-project description:** The main purposes of upgrading and improvement are: (i) to ensure the safety of the reservoir during operation, protecting 80 households and local infrastructure of Thach Ban Dong village-Cat Son commune; and, (ii) to ensure original design goals of supplying water for 130 ha of rice and crop plants in current irrigated areas of villages Thach Ban Dong, Thach Ban Tay-Cat Son Commune, modernization of operational management. The proposed civil works under the subproject are: (i) fixing of the seepage in embankment and foundation; (ii) construction of a new training wall and rehabilitation of the concrete lining of the spillway; (iii) replacement of the old outlet works with a new concrete structure; (iv) upgrading of the 845-m access and management road. Materials such as cement, steel, etc will be purchased from warehouses in Qui Nhon City, 30-40km distance from the construction site. The maximum of workers to be mobilized at the peak of construction is 80. The number of vehicles and equipment to be mobilized is around 53 units, including bulldozers, excavators, trucks, mixers, concrete pavers, generators and water pumps. The subproject has been designed and will be implemented in accordance with the World Bank Safety of Dam Policy (OP/BP 4.37) and the national standards of Vietnam.

5. **Results of Environmental and Social Screening:** The sub-project is not located within or near critical natural habitats and there are no known rare or endangered species in the area. There are also

no sites, structures or monuments with cultural, religious or historical significance within and in the vicinities of the construction site. In terms of ethnic minorities, about ninety-nine percent of the people in the area belong to the Kinh ethnolinguistic stock which currently constitutes the mainstream population of Vietnam and there are no ethnic minorities among those affected by the sub-project. The dam, having a height of 12,1 meters and a reservoir capacity of more than 700.000 cubic meters, is considered a “small” dam under the World Bank Safety of Dam Policy.

6. Impacts of the sub-project: The project will bring in considerable benefits to local community particularly in terms of stable and reliable supply of irrigation water and improved dam safety. However there are also some negative impacts due to land acquisition and construction activities that need to be mitigated. These include:

- *Loss of lands, trees and crops.* The sub-project will require acquisition of 14.4 hectares of land for widening of the access road (0.16 ha) and temporary use (14.3 ha) in the construction. This land acquisition will affect a total of 23 households (98 people). The lands to be permanently acquired includes 677m² garden land, 588m² annual crops land owned by 12 households and 346m² public land managed by Cat Son commune while the land to be temporarily used by the subproject includes 13.29-ha crop land owned by 11 households and 1.0 ha paddy rice managed by Cat Son commune. Two household will be affected with land acquisition for widening the access road. In terms of trees and crops, about 14,843 Eucalyptus and Acacia trees, twelve (12) coconut trees and 96 peach trees will be removed while about 1.5 ha of cassava crop land, 425 sq m of paddy rice field, and 49,389 sq m of annual crop land planted to ground nuts, water melon will be temporarily affected.
- *Irrigation water supply interruption.* About 355 households (1226 person) will be affected by water interruption in summer-autumn cultivation period of 2016 due to dam rehabilitation. This will affect about 44.8 ha of paddy rice land and about 30 ha of vegetables (e.g. bean, watermelon, chilli, etc.)
- *Common Construction Impacts.* The following are the negative impacts associated with construction activities:
 - 1) Increased sedimentation and turbidity - About 120.314m³ of soil will be excavated and 113.767m³ of soil will be used for filling in all the construction activities. These earthmoving activities could increase sedimentation and water turbidity. The use of properly sited borrow pit with capacity of 180.000 m³ is located at 1 km from construction site and disposal of unused excavated soils at Land area of borrow pits and disposal area 100 m from construction site should help minimize risk of massive sedimentation.
 - 2) Dust - An estimated 19 tons of dust will be generated from the operation and reparation of head works. This can pollute to air quality and impact to the 80 worker’s health on site and to the 10 households living along the construction routes.
 - 3) Noise nuisance - The residential area is located 1km away therefore only workers on site can be impacted by noise.
 - 4) Fuel spillage and used oil - The amount of waste oil generated is approximately 8,478 liters. This could cause significant damage if directly released to the environment. This potential impact will be managed under the construction site management plan prepared for the subproject.
 - 5) Increased health and safety risks to local residents and workers – Local residents will be exposed to construction hazard risks in the construction sites and routes. This will include deep excavations, loading and unloading of construction plants, the operation of machine, increased traffic in the area, increased risks related to disease transmissions between the workers and local community and vice versa, etc.
 - 6) Possible damage to existing roadways – The 1.0 km roadway to the burrow pit and the 100 m road to disposal site will likely suffer damage due to heavy traffic.

7. The long term impacts, possible land and soil degradation within and around the constructions site, particularly at the borrow pits and disposal sites, due to changes in landscape, compaction, excavation,

litters and improper disposal of construction spoils. There is also a possible increase in the use of pesticide in the irrigation service area as irrigation water becomes available on a stable and reliable basis. These potential impacts will be managed by optimising spoil disposal plan and site reinstatement before construction is completed, and IMP program.

8. Mitigation Measures: In order to address these impacts, an Environmental and Social Management Plan (ESMP) has been prepared as part of this document with proposals on institutional arrangements for impacts management, environmental monitoring and supervision, reporting requirements, capacity building as well as budget for implementation. A separate Resettlement Action/Compensation Plan has been prepared to address the impacts of land acquisition impacts. The following are the measures to be undertaken:

- Implementation of the RAP
- Incorporate environmental mitigation measures into engineering design where possible
- Consultation with the farmers on the actual timing of repair activities in the dam with the aim of minimizing impact of any disruptions in irrigation service
- Requiring the contractor as part of the contract, to undertake regular maintenance and repair of existing of the construction routes
- Requiring the contractor as part of the conditions of the contract, to prepare and submit to the PMU its own Environmental and Occupational Health and Safety Plan based on the construction- related measures identified in the ESMP, the national environmental criteria and standards as well as standard construction site safety and management plan practices, such as regular springkling at construction site to control dust, provision of warning signs, barriers on dangerous areas, and provision of adequate sanitation and waste handling facilities (i.e. septic tank and/or soak pit for domestic wastewater) at the base camp.
- Requiring the contractor to undertake clearing and restoration of construction sites and temporary easements after completion of the works; and,
- Introduction and promotion of the Integrated Pest Management approach in the irrigation service areas.

9. Consultations: Consultant and Project owner hold two consultations; the first was conducted on January 28, 2015 at office of Binh Dinh Project Management Unit with 15 participants including representative of departments, agencies of province, district, communes in Project area to communicate about Project, consultation of agreement for implementation of subproject, identifying affected scope and objects. The second consultation was carried out on March 06, 2015 at headquarters of Cat Son commune People's Committee with 40 participants including local authority and social organization, leaders of villages, representatives of affected households to inform the negative impacts of Project on environment, social and mitigation measures. Results: 100% participants support the implementation of Project and proposed mitigation measures. In addition, the affected households recommend: i) taking water from Hoi Son reservoir to irrigate approximately 40 ha agricultural land during construction phase; ii) selecting construction route which goes through Son Loc bridge to avoid impacts on residential area; iii) compensation for damage to local road and infrastructure due to construction; iv) assessing risks at downstream in case of emergency flood discharge; v) transport and disposal of all construction waste, domestic waste to avoid in attractive landscape and obstructing traffic. Project owner has recorded and committed to implement.

10. Resettlement action plan (RAP): Total area of acquired land is 144,504m², 23 households are affected, of which, area of permanently acquired land is 1,611m², area of temporarily acquired land is 142,893m². Area to be affected in summer- autumn crop in 2016 due to water interruption is 747,765m² which belong to 355 households. Estimated cost for compensation of damage is 3,374,022,498 VND, which is equivalent to 157,238 USD.

11. Risk of dam broken failure: If dam failure happen, not only the lives and livelihood of 80 households are threatened, damages would be caused to local existing infrastructures, particularly the 60 km of existing rural road, 21 km of irrigation canals, 3 schools, one health care centre, one CPC office building would In the long term it also be more efficient for the exploitation of the reservoir for

sustainable development in the region. Affected land area including: 90 ha agricultural land; 7,138.7ha forestry land and 995.27 ha perennial crops land.

12. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is VND **48,699,816,000**. Budget for ESMP implementation including:

- Environmental monitoring (VND 600,000,000, or approximately 27,900 USD, main for meeting environmental monitoring requirements of the Government of Vietnam)
- Capacity building (VND 220,000,000, or 10,200 USD)
- IPM Training (VND 120,000,000, or 5,600 USD)

XI. Subproject: Repair and improvement for safety of Song Quao Binh Thuan Province

1. Background. The repair and improvement of Song Quao Dam in Binh Thuan province is one of the subprojects being proposed for funding under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). The objectives of the subproject are: (i) to enhance the flood protection function of the reservoir; and to ensure the safety and stability of the dam headworks in order to protect downstream communities and their assets, consistent with the objectives of Vietnam's dam safety program.

2. Song Quao reservoir is located in Ham Tri commune of Ham Thuan Bac district, about 41 km from the coast. It was built in 1988 and completed in 1997. In the dry season, Song Quao is supplied water through the Dan Sach stream which takes water from La Nga River basin to supply irrigation water to 8,120 ha of paddy field and for domestic use. The catchment area of the reservoir is 296 sq. km. The capacity of the reservoir is 73 million cubic meters.

3. The head works and ancillary works of Song Quao reservoir include the following components:

- *Earth fill dams:* The dams consist of two main dams and 4 sub-dams. It is a homogeneous earth dam with a cut-off trench.
- *Main dams:* The length of the left dam is 470 m while the length of the right dam is 416m. The elevation of the dam crest is 92.0 m. The maximum height of dam is 40m. The width at the top is 6.0 m.
- *Auxiliary Dams:*
 - o Auxiliary Dams 1, 2 and 3 have a total length of 525 m and a maximum height of 25 m.
 - o Auxiliary Dam 4 has with elevation equal to natural elevation of 90.80 m, so it also serves as an emergency spillway in case of large flood.
- *Intake:* The intake is located in sub dam 1 and is a 2 m x 2.5 m reinforced concrete box culvert.
- *Spillway:* The spillway is a reinforced concrete structure with 3 curves gates (dimension 6 m x 8 m) and connected to a chute.
- *Dan Sach weir:* The weir purpose is to supply water for Song Quao reservoir from the Dan Sach stream as well as to enable discharge of water into Dan Sach stream to prevent Son Quao reservoir from overflowing.

4. The current dam is at risk: The asphalt and concrete used to reinforce the dam has deteriorated. Portions of the dam crest have peeled off and experiencing subsidence. The downstream ledge has also deteriorated and has sustained damaged at some segments. The concrete section of the dam face has been mostly cracked, particularly along the crest. Due to waves, the upstream slope of the dam has sagged and the stone pavement has become uneven. The dam slope appeared curved, rugged and aesthetically less pleasing. The downstream slope has been eroded by surface water, while the ditches and up/down thresholds are mostly damaged. Due to the impact of rainfall, both upstream and downstream slopes of the Dan Sach Weir have been eroded with bushy plants growing on the dam body. There is seepage and deep erosion at downstream slope. The permeability observation system through dam body and base is not functional, making it impossible to observe the saturation inside the dam body

5. The downstream area is the fertile delta of Ham Thuan Bac with high population density. The area is traversed by main traffic routes such as North-South railway, National highway 1A. The area is about 8-10km from the construction site and about 20 km far from Phan Thiet city. The communes along Quao River will be impacted directly by flood. These include seven (7) communes with 4 ethnic groups of Kinh, Gialay, Khơ me, Tày. The estimated number households within the dam's downstream impact area are 4,963.

6. Description of project's activities: The proposed rehabilitation works include (i) works on the dam structures (i.e. main dams and sub dams) namely the reinforcement of the dam crests with concrete, restoration of the downstream and upstream slopes; and installation of seepage monitoring equipment; (ii) construction of a second spillway with reinforced concrete; (iii) works on the Dan Sach weir which involve covering the weir and upstream slope with reinforced concrete, construction of a regulating culvert at the starting point of the diversion canal in order to prevent flood from Dan Sach river from flowing into Quao river; and, (iv) some repairs and upgrading on the construction routes and on the Management Road with total length of 5.12 km.

7. Environmental and social screening: The Song Quao Reservoir sub-project falls under Environment Category A under the World Bank classification. The dam is by definition a "large" dam under World Bank's OP/BP 4.37 classification and therefore the subproject would require the review and supervision of Panel of Expert and must prepare a Dam Safety Plan. The area is not located within or near any sensitive environment or natural habitat and there are no structures or sites in the area of cultural and historical significance that will be impacted by the rehabilitation. In the subproject area, ethnic minorities account for about 6 % of the households. The communes of Ham Tri and Thuan Hoa are inhabited by six ethnic groups, including the Kinh, Cham, Co Ho, Ra-giai, Gia Rai and Tay. However, no ethnic minority households will be affected by land acquisition. The ethnic minorities are in the downstream influence area of the dam and will be benefited from better flood management and dam safety improvements.

8. Environmental and Social Impacts: The subproject will ensure safety of downstream communities in the delta, protecting them from floods and possible breach of the dam. The farming communities within the irrigation service area will be benefited from a stable and reliable supply of irrigation water. The negative impacts of the subproject include:

9. Loss of land and dwellings. The land to be used by the subproject will have a total area of 4.9 ha, 1.2 ha of which will be permanently acquired requiring relocation of 18 households (77) people. Among these households, 3 households are considered vulnerable and 4 are headed by women. Ten (10) households would need to be relocated. No ethnic minorities have been affected by land acquisition. A Resettlement Action Plan (RAP) has been prepared in consultation with those affected.

10. Impacts of construction activities. The negative impacts of construction activities are as follows:

- Temporary increased in sedimentation of the waterways during rainy days due to earthmoving activities-Massive earthmoving will be required including extraction of more than 50,000 cubic meters at the designated burrow pit. These will have high potentials for increased sedimentation of the waterways, including the reservoir.
- Increase in dusts nuisance within the construction site and along construction routes;
- Increase in noise levels within the construction site;
- Interruption in water supply during the repair works affecting agricultural production in irrigation service areas and domestic water supply;
- Possible damage of existing roadways due to heavy equipment traffic particularly the hauling of embankment materials;
- Increase health and safety risks among local residents near the dam and along construction routes due to exposure to construction-related hazards;
- Domestic and hazardous waste (The peak number of equipment and workers in the construction site: 220 workers, 58 equipment). The amount of domestic wastes (i.e. wastewater and solid waste) will not be significant but these would require standard containment (i.e. septic tank, soak pit), collection and disposal (i.e. solid wastes to the landfill). The air emissions from the equipment also will not be significant. Hazardous materials will also require imposition of standards industry practice of storage and containment in case of spillage.

11. Long term impacts. The following are long term negative impacts, expected to be felt beyond the completion of the subproject:

- Loss of vegetation and impacts to terrestrial flora and fauna - The subproject will involve significant vegetation removal and topsoil stripped. Terrestrial fauna will lose part of their habitat particularly in the burrow pits area. Birds, insects and rodents will most likely migrate to nearby areas. There are however no rare plants and animals to be conserved in these areas.
- Land and soil degradation – This could occur at the construction sites and vicinities due to loss of vegetation, alteration of landscape due to excavation, compaction, construction spoils, litters and wastes. This impact is particularly severe in the burrow pits area.
- Increased use of pesticides - The improved irrigation water supply is also expected to promote intensive agricultural production in the service area thereby increasing use of pesticides.

12. Mitigation Measure. An Environmental Management Plan (ESMP) has been developed as part of this ESIA report to address these impacts. The ESMP requires the adoption/implementation of the various other safeguards instruments which have been prepared for the sub-project such as, the Resettlement Action Plan/Compensation Plan, Gender Development Plan, Public Consultation, Participation and Communication Strategy and, Grievance and Redress Mechanism. Other measures in the ESMP include:

Implementation of the construction strategies and plans to minimize water supply interruptions to the service areas, namely:

- Careful and optimal scheduling and timing, use of cofferdams to allow construction without draining the reservoir
- Provision of alternative sources such as the plan to use water from 812-Chau Ta Canal. All these in close consultation with the affected farmers to minimize cropping disruptions.
- Impose good housekeeping practices at the construction site in terms of storage of materials, disposal of construction spoils to a properly sited landfill, regular sprinkling of roads in residential areas during dry days. All these to be incorporated in Contractor's own Environmental and Occupational Health and Safety Plan (CEOHSP) together with standard construction EHS practices such as wearing of PPEs, provision of adequate water and sanitation facilities at campsite, waste management including domestic wastewater and hazardous waste, medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations.
- Proper operation of the burrow pit, including the careful stockpiling of materials away from water channels and runoff and providing silt traps on strategic sections.
- Requiring the contractor to undertake site clearing, cleaning and restoration after completion of works, including the leveling of stockpiled surface soils in the burrow pit area and returning the ground for people to continue farming.
- Installation of a Dam Management Unit and the preparation of Emergency Preparedness Plan as recommended in the Dam Safety Assessment Report.
- Introduction and promotion by MARD of the Integrated Pest Management (IPM) technologies and approaches among the farming communities within the irrigation service areas.
- Adoption and setting up of a Grievance Redress Procedure.
- Adoption of Chance Archaeological Find Procedure
- Adoption of Unexploded Ordnance Procedure

13. Consultation: Consultant and Project owner hold two consultations; the first was conducted on February 03, 2015 at Binh Thuan DARD with 23 participants including representative of departments, agencies of province, district, communes in sub-project area to communicate about sub-project; Consultation measures meeting was carried out on February 05-13, 2015 in phases at CPC's headquarter with participant participated 129 persons (21% of total participant is women), the social unions of: people's Committees, Fatherland Front Committees commune, veterans, Women's Unions, youth Unions, farmers' associations, cooperatives, village leaders, the affected households in the areas, consultation of agreement for implementation of subproject, identifying affected scope and objects. The second consultation was carried out on March 12th, 2015 at headquarters of Thuan Hoa CPC,

Ham Tri CPC, Ham Thuan Bac district with 133 participants including local authority and social organization, leaders of villages, representatives of affected households to inform the negative impacts of sub-project on environment, social and mitigation measures. Results: 100% participants support the implementation of sub-project and proposed mitigation measures. In addition, the affected households recommend: (i) The material transport vehicle have to operate in night time to avoid the impact to local people. The vehicle have to cover during material carrying., watering road surface to reduce dust; (ii) Develop a plan and train local people to respond the case of releasing water at spillway no. 2; (iii) A plan of evacuation, protection for assets of 20 households of Ham Tri commune in case of flood; (iv) The auxiliary areas and camping site have to locate in dam corridor to avoid land acquisition and compensation and flooding event. The Binh Thuan Irrigation Company has committed to follow the proposed mitigation measures mentioned in the ESIA.

14. Resettlement action plan (RAP): The rehabilitate existing structures of song Quao reservoir will permanent land acquisition 164,332 m² with 2.332m² of residential land (All land in the service corridor of demand) and influence on households is negligible with 18 HHs (77 persons) in Thuan Hoa commune will be affected including 3 vulnerable HHs (1 poor, 2 lonely HHs). Ham Tri commune far away to the downstream is not affected by land acquisition. The total estimation cost for compensation, supporting to resettlement is 8,806,230,000 VND in which the supporting cost is 183,600,000 VND for House renting, Life assistance and vulnerable household assistance. And contingency and Management cost are 1,760,000,000 VND.

15. The Ethnic Minority Development Plan (EMDP): There are 12 ethnic groups in the Sub - project area, the Cham, Co Ho and Raglai are ethnic groups living in the area for a long time, other minority groups have very few people living with the local community, there is no cultural activities bring own identity. There will not water cut during construction, but the subprojects with ethnic minorities may have adverse impacts on ethnic minorities during the construction period. The consultation with EM in the FPIC manner shows that there is broad community support from EM peoples for the subproject implementation. These EM development activities include: i) Training on agriculture development; ii) Training on business skills; iii) Guidance on traffic safety and prevention of social evils. Total budget for these Development activities is 2,790,000,000VND. EMDP will be further updated on the basis of the detailed design of the subproject.

16. Risk of dam broken failure: Although the risk of dam failure is greatly reduced and dam's capacity to accommodate floods is enhanced by the subproject, the risk of catastrophic failure remains significant because of the magnitude the potential impacts downstream. Close to 200,000 hectares of farmlands are at risk at the downstream. Infrastructure would be damaged: 155km of asphalt road; 50km irrigation canals; 15 schools; 7 health care centers, 13 CPC office buildings; 1 Domestic water supply works and 100 km power line. Affected land area including: 12,900 ha agricultural land and 100 ha aquaculture land. If the Quao River overflows, the number of people to be affected would be staggering. An upgraded management system would be needed as well an Emergency Response Plan would need to be installed.

17. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. The total subproject cost is estimated at VND 271,204,000,000. The total estimated cost of the ESMP implementation is VND 11,659,000,000.

XII. Subproject: Repair and Improvement of Da Teh Reservoir, Lam Dong Province

1. **Background:** The “*Repair and Upgrading of Da Teh Reservoir*” is one of the sub-projects being proposed for funding under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). An Environmental and Social Impact Assessment (ESIA) was conducted in compliance with the World Bank requirements and the Vietnam's Law of Environmental Protection (LEP). This report provides a summary of the result of the ESIA.

2. **The reservoir** is located in My Duc commune, Da Teh district, Lam Dong province. It is about 180km and 150km far from Da Lat city and Ho Chi Minh City, respectively. The reservoir has a basin area of 198 km² and a capacity of 29.35 million cubic meters. Its head works complex and auxiliary works include following items:

- Earth dam
- Flood spillway
- Water intake
- Operation house and communication system for management purpose
- Power lines and electricity distribution system; and
- Management road.

3. **The facility needs** immediate rehabilitation due to lack of regular maintenance work since construction 1995. There are multiple occurrence of landslides on the embankments and water leakages and penetration have occurred at the embankment foundation. During operation, the physical structure has been damaged, degraded and disqualified with the irrigation design capacity, raising highly potential risks for the headworks and threatening the safety of downstream area. Although some damaged sections have been reinforced, the water regulation function, reservoir capacity are no longer met and safety can no longer be guaranteed.

4. **Subproject description.** The proposed rehabilitation and improvement of the dam and reservoir aims to: (i) assure reservoir safety during operation principally by repairing and retrofitting for extreme weather events; and (ii) meet increasing demand for water in the lowland area by restoring the initial design capacity and stable supply of irrigation water to 2,300 hectares of rice paddy field and other crops whole year round. The proposed works would involve the following:

- **Earth Dam:** Repair on the dams include rehabilitation and expansion of the downstream section to restore embankment at the desired compaction coefficient; reinforcement of the top of the dam by a 20-cm thick M200 concrete; repair of the upstream and downstream roofs; and fixing of the water seepages and penetration in the dam body and foundation.
- **Flood Spillway:** Works include expansion and upgrade of the overflow weir, rehabilitation of the chute and flanks with reinforced concrete and rebuilding of the weir bridge, among others.
- **Water Intake:** Various repair works including clearing and re-lining of the culvert, reinforcement of the external valve tower, repair of the tower building and service bridge, replacement of the steel gate, etc.
- **Operation House and Communication System:** Construction of head works operation house with 4th grade house standard and gross area of 150m² and installation of automatic reservoir water level observation system to facilitate the works management and operation.
- **Power Line:** Installation of 1.8 km long LV wire lines from weir shoulder to flood spillway for management and operation purpose.
- **Management Road:** Reinforcement of the section behind the water intake to flood spillway with specifications of 1.7km length, M200 concrete, 20cm thickness and 3m width.

5. **These repair and upgrading works** were identified based on the Dam Safety Assessment conducted as part of the preparation of the DRSIP project. The subproject was designed and will be implemented in accordance with the requirements of the World Bank Safety of Dam Policy (OP/BP 4.37) and the national dam safety standards of the Socialist Republic of Vietnam.

6. Environmental and Social Screening. The subproject underwent mandatory environmental and social screening to determine any ineligible activities from the safeguards policies point of view and determine the scope of the assessment. The results of the screening indicate that the subproject will not result in increase of the designed water storage capacity of the dam. The local residents in the area are mainly Kinh (92.7%) which is the mainstream group in Vietnam. No ethnic minority households are affected. There are no graves, temples or any structure or sites with cultural, religious or historical significance in the subproject area. The proposed civil works falls under the World Bank Environment Category B while the dam is considered “small” based on the World Bank classification. There are no critical natural habitats or protected areas of natural habitats in the area and there are no species in the rare and endangered lists in the area.

7. Social and Environmental Impacts: The subproject will provide benefits to the local communities in the form of stable and reliable water supply and improved safety. However, there are also negative impacts and issues that need to be addressed. There following the impacts and issues considered significant and would need to be mitigated:

8. Loss of land - A 1.0 hectare of public land at the dam shoulder currently under the Commune's management will be used as burrow pit for embankment materials. No household will be affected in the land acquisition.

9. Impacts of construction activities - The total excavated soil volume is about 80,000m³, which will be sourced within 200 m distance from 7site. The backfilling soil volume required for the entire works is about 93,000 m³. Hence all excavated soils will be reused. The spoil consisting of top soil and herbage is estimated at 5,000 m³ shall disposed at the bottom of the downstream slope of the dam. Other materials such as stone and gravel will sourced at various quarry sites 10-70km away. The number of workers estimated at peak hours would be 150 persons while the total number of equipment to be mobilized is around 40.

- Temporary increase in sedimentation of the waterways during rainy days due to earthmoving activities.
- Increase in dusts nuisance within the construction sites;
- Increase in noise levels within the construction site;
- Increase health and safety risks among local residents near the dam and along construction routes due to exposure to construction-related hazards;
- Domestic and hazardous waste - The amount of domestic wastes (i.e. wastewater and solid waste based on a peak of 150 workers) will be significant. These would require adoption of a comprehensive housekeeping and waste management system by the contractor. Standard waste containment and treatment measures (i.e. septic tank, soak pit), regular collection and disposal (i.e. solid wastes to the landfill). Hazardous materials will also require imposition of standards industry practice of storage and containment in case of spillage.

10. Mitigation Measures. To address these impacts, an Environmental Management Plan (ESMP) has been prepared as part of this ESIA report. The specific measures in the ESMP are as follows:

- Careful and optimal scheduling of construction activities to coincide with fallow periods, in close consultation with the affected farmers to minimize cropping disruptions.
- Imposition of good housekeeping practices at the construction site in terms of storage of materials, disposal of construction spoils to the designated landfill, regular sprinkling of roads in residential areas during dry days. All these to be incorporated in Contractor's own Environmental and Occupational Health and Safety Plan (CEOHSP) together with standard construction EHS practices such as wearing of PPEs, provision of adequate water and sanitation facilities at campsite, waste management including domestic wastewater and hazardous waste, medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations. Compliance with the relevant environmental protection criteria should also be included the plan.

- Requiring the contractor to undertake site clearing, cleaning and restoration after completion of works, including the leveling of stockpiled surface soils in the burrow pit area and returning the ground for people to continue farming.
- Introduction and promotion by MARD of the Integrated Pest Management (IPM) technologies and approaches among the farming communities within the irrigation service areas.
- Constant communication and consultation with the stakeholders during construction to apprise them of the status and progress and also to hear complaints and problems;
- Adoption and setting up of Grievance Redress Mechanism; and,
- Adoption of Chance Find Procedure and Unexploded Ordnance Procedure.

11. Consultation: Consultants and sub-project investors organized 2 community consultations, the first one dated February 03, 2015 at the Cultural House of My Duc commune with 30 participants (Including 22 women) People's Committee of Da Teh district, People's Committee and Fatherland Front of communes fully support the implementation of the Project, the affected people in the project area were informed the project profile information and consultation on consensus subproject implementation, determine the scope and influence of the project. The second one dated February 04, 2015 at the Cultural House of Quang Tri commune with 30 participants (Including 6 women) People's Committee of Da Teh district, People's Committee and Fatherland Front of communes fully support the implementation of the Project, Consultation is to inform about the negative impact of the sub-project on the environment, society and the mitigation measures. Results: 100% of Participant agreed to implement the project and the mitigation measures by investors. In addition, the affected households recommend to: i) Provide enough water for 2,300 hectares of agricultural land in the process of building the reservoir Da Teh; ii) repair damaged roads if necessary; iii) Assessment of danger for downstream areas in case of emergency flood discharge; iv) Transport, handle the entire construction waste, household waste and construction and aesthetic avoid obstructing traffic. v) Ensure safety during the construction phase; vi) Ensure safety for the workers at construction sites, public health. Investors were receptive and committed to implement all the recommendations in consultation.

12. Resettlement Action Plan: On the basis of the proposed scope of work, no land acquisition (either permanent or temporary) are required. This, no RAP is prepared for this subproject.

13. The Ethnic Minority Development Plan (EMDP): In the project area, there are two main ethnic groups live, they are Kinh Chau Ma, and other ethnic groups such as Tay, Nung. Kinh accounted for most of the project area, with 1,472 households, accounting for 91.2%. Chau Ma live in villages 8, My Duc commune with a total of 134 households, 521 people accounted for 8.3% percentage. Other ethnic groups such as Tay, Nung come from other locations with a total of about 8 households, accounting for 0.05%. Restoring livelihoods for communities; Communication programs; Support clean water to households). With a total cost of 572 million VND proposed (26,600\$). The EMDP will be further updated on the basis of the detailed design of the subproject.

14. Risk of dam broken failure: When dam break incidents occur, there would be some consequences: Demolition of buildings, infrastructure, directly affect the lives and property of approximately 1,600 households in town and 2 communes named Da Teh and My Duc, Quang Tri Province, about 10,000 people in a foot dam of downstream 500m - 600m; Cause floods, destroying ecosystems after dams; Cause the lost or lack of water resources for agriculture of around 2,300 ha; damage 10km of roads, 20km of canals; 4 schools; 2 health centers; 2 head office commune People's Committees; Cause affected people to lack water for daily life with a capacity of 10,000 m³ / day of water supply for the town of Da Teh, My Duc, Quang Tri commune.

15. Budget Allocation: Investment capital of sub-project: VND 82,695,623,000 (*Eight billion six hundred and ninety five million six hundred and twenty three thousand Vietnam dong*) or US\$ 3,792,421 (*Three million seven hundred ninety two thousand four hundred twenty one US dollars*). The cost for the implementation of the ESMP would be VND 1,759,453,000 ((USD 80,565) during the construction phase and VND 500,000,000 (USD 22,900) during operation phase. However, this cost does not include the cost of coffer dam construction and plantation.

C. GRIEVANCE AND REDRESS MECHANISM

1. Requirements of the OP 4.12

The World Bank's resettlement policy mentioned in the OP 4.12 requires each sub-project to establish for grievance redress mechanism and determines that the prime responsibility for handling grievances raised by the APs is the project developers. This mechanism aims to ensure APs' satisfaction with implementation of the RAP, and provide the APs with a legal platform for monitoring and reporting on the RAP implementation. Specifically, the purposes of the grievance mechanism are to allow APs to seek satisfactory resolution to grievances they may have in relation to possible land acquisition or other project interventions. The key principles of the grievance mechanism are to ensure that:

- a) The basic rights and interests of APs are protected
- b) The concerns of APs arising from the project implementation process are adequately addressed
- c) Entitlements or livelihood assistance for APs are provided on time and accordance with the above safeguard policies of the Government and the WB.
- d) APs are aware of their rights to access and shall have access to grievance procedures free of charge for the above purposes; and
- e) The grievance procedures will be an important part of the conflict resolution mechanism that is community-based, involving ethnic minorities and representatives of other vulnerable groups, and therefore, collectively managed.

At the beginning of the project implementation, Grievance Redress Committees will be established from communal to provincial levels based on the existing structures consisting of concerned departments, mass organizations, women and ethnic representatives. At the communal level the community-based organization will incorporate the existing grievance mechanisms that will be chaired by leader of Communal People's Committee (CPC). The grievance mechanism and procedures will resolve complaints, and with the availability of local resources resolve conflicts not only on safeguard issues but also others during project implementation. Based on this structure, the community-based organization would assist during the project preparation, design, implementation, and future developments. The grievance mechanism will be applied to persons or groups that are directly or indirectly affected by a project, as well as those that may have interests in a project and/or have the ability to influence its outcome either positively or negatively.

APs, if not satisfied or unclear about the RAP implementation and compensation may raise their complaints to the CPC. The claim may be made orally or in writing with assistance from the CPC who shall provide response to the claimant within 5 days after receipt of the grievance. If the claimant is not satisfied with the decision made at the commune level, she/he may submit the claim to the district PC with support from the PPMU. Within 15 days after receipt of the claim, the district committees shall make decision and provide response to the claimant. The claim may be lodged with Provincial Court of Law whose judgment would be final.

All complaints and grievances will be properly documented and filed by the commune and district PCs as well addressed by PPMUs through consultations in a transparent and proactive manner. These grievance documents and report will be made public accessible. All costs associated with grievance handling process incurred by the claimant and/or her/his representatives are to be covered by the project developer. The grievance handling process is described below:

2. Grievance Redress Mechanism

In order to ensure that all APs' grievances and complaints on any aspect of land acquisition, compensation and resettlement are addressed in a timely and satisfactory manner, and that all possible avenues are available to APs to air their grievances, a well-defined grievance redress mechanism needs to be established. All APs can send any questions to implementation agencies about their rights in

relation with entitlement of compensation, compensation policy, rates, land acquisition and grievance redress. APs are not required to pay any fee during any of the procedures associated with seeking grievance redress including if resolution requires legal action to be undertaken in a court of law. This cost is included in the budget for implementation of RAPs.

The steps of Grievance Redress Mechanism are as follows:

First Stage - Commune/Ward People's Committee

An aggrieved APs may bring his/her complaint to the One Door Department of the Commune/Ward People's Committee, in writing or verbally. The member of CPC/WPC at the One Door Department will be responsible to notify the CPC/WPC leaders about the complaint for solving. The Chairman of the CPC/WPC will meet personally with the aggrieved APs and will have 30 days following the receiving date of the complaint to resolve it. The CPC/WPC secretariat is responsible for documenting and keeping file of all complaints handled by the CPC/WPC.

Second Stage - At District People's Committee (DPC)

If after 30 days the aggrieved affected household does not hear from the CPC, or if the APs is not satisfied with the decision taken on his/her complaint, the APs may bring the case, either in writing or verbally, to any member of the DPC or the DRC of the district. The DPC in turn will have 30 days following the receiving date of the complaint to resolve the case. The DPC is responsible for documenting and keeping file of all complaints that it handles and will inform the DRC of district of any decision made. Affected households can also bring their case to Court if they wish.

Third Stage - At Province People's Committee (PPC)

If after 30 days the aggrieved PAP does not hear from the DPC, or if the PAP is not satisfied with the decision taken on his/her complaint, the PAP may bring the case, either in writing or verbally, to any member of the PPC or lodge an administrative case to the District People's Court for solution. The PPC has 45 days within which to resolve the complaint to the satisfaction of all concerned. The PPC secretariat is also responsible for documenting and keeping file of all complaints that it handles. Affected households can also bring their case to Court if they want.

Final Stage - Court of Law Decides

If after 45 days following the lodging of the complaint with the PPC, the aggrieved PAP does not hear from the PPC, or if he/she is not satisfied with the decision taken on his/her complaint, the case may be brought to a court of law for adjudication. Decision by the court will be the final decision.

Decision on solving the complaints must be sent to the aggrieved APs and concerned parties and must be posted at the office of the People's Committee where the complaint is solved. After three days, the decision/result on solution is available at commune/ward level and after seven days at district level.

In order to minimize complaints to the provincial level, PMU will cooperate with the District Resettlement Committee to participate in and consult on settling complaints;

Personnel: The Environmental and Resettlement staff assigned by PMU will formulate and maintain a database of the APs' grievances related to the Project including information such as nature of the grievances, sources and dates of receipt of grievances, names and addresses of the aggrieved PAPs, actions to be taken and current status.

In case of verbal claims, the reception board will record these inquiries in the grievance form at the first meeting with affected people.

The independent monitoring Consultant will be responsible for checking the procedures for and resolutions of grievances and complaints. The independent monitoring Consultant may recommend further measures to be taken to redress unresolved grievances. During monitoring the grievance redress procedures and reviewing the decisions, the independent monitoring agency should closely

cooperate with the Vietnam Fatherland Front as well as its members responsible for supervising law enforcement related to appeals in the area;

The grievance resolution process for the Project, including the names and contact details of Grievance Focal Points and the Grievance Facilitation Unit (GFU), will be disseminated through information brochures and posted in the offices of the People's Committees at the communes and districts and PMU.

At the same time, an escrow account for resettlement payments should be used when grievance is resolving to avoid excessive delay of the project while ensuring compensation payment after the grievance has been resolved.

To ensure that the grievance mechanism described above are practical and acceptable by APs, it were consulted with local authorities and communities taking into account of specific cultural attributes as well as traditional-cultural mechanisms for raising and resolving complaints and conflicting issues. The ethnic minority objects and efforts were also identified and determined which culturally acceptable ways to find the solution are.