

**MINISTRY OF AGRICULTURAL AND RURAL DEVELOPMENT**

**ADDITIONAL FINANCING TO LIVESTOCK COMPETITIVENESS AND  
FOOD SAFETY PROJECT  
(AF LIFSAP)**

**ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF)**

**November 2014**

## ACRONYMS AND ABBREVIATIONS

BOD	Biochemical Oxygen Demand
CDM	Clean Development Mechanism
CPMU	Central Project Management Unit
COD	Chemical Oxygen Demand
DARD	Department of Agriculture and Rural Development
DONRE	Department of Natural Resource and Environment
DPI	Department of Planning and Investment
DLP	Department of Livestock Production
EIA	Environmental Impacts Assessment
MARD	Ministry of Agriculture and Rural Development
MOF	Ministry of Finance
MOH	Ministry of Health
MONRE	Ministry of Natural Resources
EMF	Environmental Management Framework
ESE	Environmental Supervision Expert
FAO	Food and Agricultural Organization
GAHP	Good Animal Husbandry Practices
GHG	Greenhouse Gases
NGO	Non-Governmental Organization
GoV	Government of Vietnam
HACCP	Hazard Analysis Critical Control Points
HF	Hydrogen Fluoride
HPAI	Highly Pathogenic Avian Influenza
HSEMP	Health Safety Environment Management Plan
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
ISO	International Standard Organization
LPZ	Livestock Production Zones
PMU	Project Management Unit
POP	Persistent Organic Pollutants
PSMP	Performance Standard Management Plan
SS	Suspended Solids
ToR	Terms of References
TSS	Total Suspended Solids
VFA	Vietnamese Food Administration
WTO	World Trade Organization

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## I. INTRODUCTION

In 2006 the World Bank supported MARD to prepare the Vietnam Food Safety and Agricultural Health Action Plan and it commissioned FAO to conduct on a study on the Competitiveness of the Livestock Sector in Vietnam. The **Livestock Competitiveness and Food Safety Project** (LIFSAP) is the logical continuation of this program of action to address the livestock competitiveness and food safety issues facing Vietnam. The Project is providing support for implementation of the government's *strategy for the livestock sector development toward 2020*, particularly according the accomplishment of its production and food safety goals..

With assistance of the Environmental Specialists from the project Preparation Team in WB and FAO, the MARD whose representative is the Department of Livestock Production (DLP) has prepared this Environmental Management Framework (EMF) in order to meet the environmental management requirements of both Vietnamese government and the World Bank. The English version of this EMF has been reviewed and revised based on the comments given by the World Bank.

This EMF is prepared in order to set a framework for environmental impact assessment, mitigation and monitoring of the potential impacts that will be applied during the implementation of activities under LIFSAP.

Provincial DARDs and DONREs from project provinces have been consulted during the preparation of this EMF. The draft English version of the EMF has been reviewed and commented by the World Bank. This final draft version has been revised based on these comments.

## II POLICY, LEGAL AND REGULATORY FRAMEWORK

### 2.1 Vietnamese Environmental Legislations

- The Ordinance on No. 18/2004 / PL-UBTVQH11 of the National Assembly Standing Committee: Ordinance on Veterinary
- Environment Protection Law No. 55/2014/QH13 dated June 23, 2014 of the National Assembly environmental protection activities, policies, measures and resources for environmental protection, benefits and responsibilities of organizations, households and individuals in environmental protection (valid from January 1, 2015)
- Decree 35/2014 established guidelines for environmental protection projects, EIA, environmental commitment, environmental protection scheme (Decree comes takes effect from 2015).
- Decree 29/2011 established guidelines for environmental<sup>1</sup> protection projects, EIA, environmental commitment, environmental protection scheme.
- Decree No. 40/2009 / ND-CP provides for administrative violations, sanctioning forms and levels, remedial measures, competent to sanction administrative violations of the veterinary.
- Circular No: 02/2011 / TT-BNNPTNT Guide task of state management of livestock

- Circular No. 22/2014/TT-BTNMT dated May 5, 2014 of the Ministry of Natural Resources and Environment defining and guiding the implementation of the Government's Decree No. 35/2014/ND-CP dated April 29, 2014 amending and supplementing a number of articles of the Government's Decree No. 29/2011/ND-CP dated April 18, 2011 providing strategic environmental assessment, environmental impact assessment and environmental protection commitment.
- Circular No 26/2011/TT-BTNMT on July 18, 2011 providing guiding regulations on environmental impact assessments and environmental protection commitments.
- Circular No. 21/2013 / TT-BNNPTNT the list of plant protection drugs prohibited from using in Vietnam
- Circular 25/2011 / TT-BYT on the list of chemicals and derivatives insecticide and bactericide permitted uses, use restrictions and banned from use in Vietnam
- Circular 15/2009/ TT-BNN issued drugs, chemicals and antibiotics prohibited from using, limited use
- Circular No. 03/2012 / TT-BNN dated 16/01/2012 on amending and supplementing Circular No. 15/2009 / TT-BNN dated 17/3/2009 of the Ministry of Agriculture and Rural Development promulgating the list of drugs, chemicals and antibiotics prohibited from using, restricted use.
- Circular No. 77/2011 / TT-BNN dated 03/11/2011 promulgate additional list of veterinary drugs, vaccines, biological products, microorganisms, chemicals used in the veterinary Circulating in Vietnam.
- Circular No. 32/2011 / TT-BNNPTNT promulgate a list of vaccines, biological products, microorganisms, chemicals used in veterinary medicine are allowed to circulate in Vietnam.
- Circular No. 31/2011 / TT-BNNPTNT promulgating the list of veterinary drugs permitted for circulation in Vietnam.
- Circular No: 60/2010 / TT-BNNPTNT regulations on veterinary hygiene conditions for slaughter pigs by the method of manual or semi-automatic
- Circular No: 61/2010 / TT-BNNPTNT regulations on veterinary hygiene conditions for poultry slaughter by mode manually or semi-automatically
- Decision No. 50/2014 / QD-TTg on support policies to improve the efficiency of livestock farmers in the period of 2015-2020
- QCVN 01-25: 2009 / BNNPTNT. National Technical Regulation on waste management in slaughter cattle and poultry
- QCVN 01-41: 2011 / BNNPTNT. National Technical Regulation on the hygiene requirements for handling the destruction of animals and animal products
- QCVN 01-79: 2011 / BNNPTNT. National technical regulations on livestock facilities, poultry - Inspection procedures, evaluation of veterinary hygiene conditions.
- QCVN 01-41: 2011 / BNNPTNT. Prescribed standards of hygiene required the veterinary treatment for sick animals, dead animals infected or suspected of infection on the list must publish epidemic diseases which were required to be destroyed.
- QCVN 01-25: 2010 / BNNPTNT This regulation applies to the field of slaughter cattle and poultry.
- QCVN 01-14: 2010 / BNNPTNT. Regulations on conditions for bio-security pig farms
- QCVN 01-25: 2010 / BNNPTNT regulations in slaughtering cattle and poultry
- QCVN 40: 2011 / MONRE - National Technical Regulation on industrial wastewater
- QCVN 39: 2011 / MONRE - National Technical Regulation on water use for irrigation
- QCVN 14: 2008 / MONRE - National technical regulation on domestic wastewater

## 2.2 State Administration Agency for livestock industry - Department of Livestock production (DLP)

At central level, the Ministry of Agriculture and Rural Development (MARD) is the national agency responsible for livestock industry. Livestock environmental management responsibility is assigned to Department of Livestock Production (DLP), particularly its Livestock Environmental Division (LED), which was established in 2007.

The function and responsibilities of the Livestock Environmental Management Division (LEMD) are described below:

### Function and Responsibilities of the DLP's LEMD

#### Function and Responsibilities of the Livestock Environmental Management Division, - DLP (Decision No. 57/QD-CN-VP by DLP Director dated 24 April 2008)

*Function:* Assist DLP leaders to manage the livestock production sector at national level, and to implement environmental management, products quality and food safety management in livestock sector

- (a) Prepare strategy, carry out planning, prepare plans and legal documents on environmental management in livestock production
- (b) Coordinate environmental management activities in livestock production sector, including:
  - Appraise and manage livestock environmental management projects
  - Set up and maintain environmental database, prepare environmental reports regarding livestock production
- (c) Environmental Management: Take lead in
  - Preparing national standards applicable to livestock waste treatment
  - Guiding and monitoring the implementation of environmental protection
  - Monitoring and inspection compliance to national standards. Coordinate with other agencies in carrying out EIA and proposing mitigation measures
- (d) Food quality and safety management, from inputs of livestock production;
- (e) Research;
- (f) Take part in coordinating agricultural extension activities which also cover environmental protection in livestock production;
- (g) Take part in livestock environmental protection promotion activities;
- (h) International Cooperation: propose and prepare international cooperation environmental projects regarding livestock production;
- (i) Manage public services on livestock environmental management: policy development, provide guidance during implementation;
- (j) Manage organisations providing public livestock environmental services: policy development, provide guidance and assistance during implementation.
- (k) Check and carry out planned/random inspections on environmental compliance and take part in addressing complaints

The division has been structured with one head, one deputy and specialists that bring the total number of staff to six. To date, two engineers (one in agriculture and one in biotechnology) have been in place and recruitments of additional staff are on-going.



## 2.3 Applicable World Bank Safeguard Policies

The following Environmental Safeguards Policies are triggered, based in the features and components of the project:

### **OP 4.01 Environmental Impacts Assessment**

The objective of OP 4.01 is to ensure that the Bank's financed activities are environmentally sound and sustainable. The World Bank funded projects are screened by the Bank for potential environmental impacts during the project preparation phase. Environmental impacts related to the proposed project activities would be identified and appropriate measures for mitigating the negative impacts would be proposed.

### **OP4.09 Pest Management**

OP 4.09 may be triggered under LIFSAP as some chemicals would be provided for disinfection of farms or flies control related to manure management. All activities including transportation, contact, usage, or disposal of pest control substances or containers carried out under LIFSAP will ensure safety to human and the environment by the implementation of appropriate mitigation measures.

The World Bank requires environmental assessment (EA) of a project proposed to ensure that the project assess the environmental impacts and includes preventives and mitigation measures.

The EA evaluates a project's potential environmental risks and impacts in its area of influence, examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

The LIFSAP is classified as World Bank's Environmental like **Category B**, so *the* impacts are site-specific, in most cases mitigatory measures can be designed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

Based in the features of the LIFSAP, and since the impacts cannot be determined until to define the sub-project details, the EA instrument used is Environmental Management Framework (EMF).

The EMF sets out the principles, rules, guidelines and procedures to assess the environmental impacts. It contains measures and plans to reduce, mitigate negatives impacts and enhance positive impacts, provisions for estimating and budgeting the costs of such measures.

## **III PROJECT DESCRIPTION**

The Project's development objective is: *"to improve the competitiveness of household-based livestock producers by addressing production, food safety and environmental risks in livestock product supply chains in the selected provinces."* The main project beneficiaries will be household livestock producers<sup>1</sup>.

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<sup>1</sup> These are defined under LIFSAP as those have livestock as their major source of income and the family is providing the majority of the labour required for the enterprise

**The parent Project** has three components, described below:

### **3.1 Component A: Upgrading Household-Based Livestock Production and Market Integration**

The Component A is designed to: (a) increase the production efficiency of participating household livestock producers by introducing Good Animal Practice (GAP); (b) providing produce safer meat by upgrading slaughterhouses and meat markets; and (c) reducing environmental pollution by improving livestock waste management practices.

The Component will be implemented at the provincial level and will cover selected priority livestock production areas within each of the project provinces. Implementation takes a value chain approach and focuses on improving meat production and marketing chains by linking participating production areas with slaughterhouses and meat markets identified for upgrading by the project. The Component has four following Sub-components:

1. Promoting GAP in priority production areas;
2. Piloting of Livestock Production Zones (LPZs);
3. Upgrading Slaughterhouses and Meat Markets; and,
4. Provincial Capacity Building and Monitoring.

#### **Subcomponent A.1: *Promoting GAP in Priority Production Areas.***

The Sub-component would support the introduction of Good Animal Practice (GAP)<sup>2</sup> to household livestock producers in selected priority livestock production communes in each of the project provinces<sup>3</sup>. Project beneficiaries would be the more progressive household pig and poultry producers who are willing to adopt GAP procedures designed to improve livestock production efficiency, disease control, food safety and livestock waste management. The program to be financed under this subcomponent includes:

- (a) Extension services for implementing GAP
- (b) Piloting of identification on participating farms for trace back;
- (c) Livestock waste management and bio-security measures, and
- (d) Monitoring and certification of GAP farms

Extension for GAP would cover animal husbandry, safe (harmful additive-free) feeding, disease control and bio-security and would be implemented by farmer groups organized by the commune extension worker<sup>4</sup>. First, extension workers and veterinary staff at commune and

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<sup>2</sup> VIETGAP is a very comprehensive set of procedures and it is targeted at large scale producers with the financial resources necessary to meet the high standards it sets. Since LIFSAP is targeted at household producers, some adjustments would need to be made to be applicable to households' conditions.

<sup>3</sup> The priority communes have already been selected in the first four provinces. For the 8 remaining provinces, which are expected to commence implementation in PY2, a "risk assessment" study would be carried out to identify the priority production areas and marketing chains to be supported by the project. See Component C for the details of the study that will be undertaken.

<sup>4</sup> In introducing GAHP procedures, groups are considered to be the best way to deliver extension messages. They also create peer pressure which is essential where high adoption rates are needed to

district levels would receive training in the principles of GAP and the details of each of the GAP interventions in animal husbandry, food safety, disease control and bio-security being promoted. These extension staff, as Master Trainers, would in turn become responsible for training and supervising participating farmers. Based on the training provided, GAP farmer groups are expected adopt good husbandry practices to improve environmental impact and food safety of the livestock and meat they produced. In addition to training, the project would support improved animal health services through the upgrading of the disease reporting system and the provision of veterinary equipment and travel allowances for district staff to ensure there would be adequate veterinary back-up to service the GAP groups<sup>5</sup>. The project would also support improved bio-security by providing household producers with basic personal protective equipment and chemicals (i.e., sprayers, disinfectants, clothing, etc) to contain emergency outbreaks.

A simple livestock identification system would be developed and piloted on household pig farms belonging to GAP groups. In order to participate, the pilot household has to agree to have all their pigs identified with an ear tattoo. The tattoo would consist of a code based on letters and numbers<sup>6</sup>, applied while young pigs are first vaccinated. Meat inspectors would be instructed to monitor the number of animals with identification tattoos passing through their slaughterhouses. The project would supply tattoo application pliers and a set of numbers to each of the para-vets vaccinating<sup>7</sup> pigs.

Livestock waste management and Bio-security measures. To help encourage participating farmers to adopt good livestock waste management practices, the project would provide small grants, to the farmers to construct bio-digesters or composting facilities (up to US\$250 per household). Farmer participation would be voluntary through registration with the commune GAP extension worker. Matching grants will be available for private sector activities, that can demonstrate substantial public benefits in terms of meeting food safety standards or contributing to animal disease control and bio-security. .

Eligible for financing would include: (a) the construction of vehicle inspection and cleaning facilities at the entrance to the LPZs or barriers to vehicle entry; (b) a quarantine area/pen on a farm; (c) footbaths and associated chemicals at the entrance to farms and between production sheds; (d) serological testing of compliance with agreed vaccination and feed additive operational procedures; (e) cleaning and disinfection equipment (sprayers etc).

Monitoring and certification. The program is designed to encourage good production practice and part of that process will involve the monitoring of producers' performance and awarding

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maximize benefits to a community. In LIFSAP these conditions prevail in disease control, waste management and in promoting the safe use of antibiotics and other feed additives.

<sup>5</sup> Bank funds would not be used to purchase vaccine which is generally provided on a subsidized basis by the government.

<sup>6</sup> The code would be developed by a national consultant who would also be responsible for holding training programs and demonstration on the technique in each of the participating provinces.

<sup>7</sup> A set of tattoo pliers and letters/numbers is estimated to cost less than US\$100 and the operating cost is negligible except for the labor needed to apply the tattoo - because the tattoo will be applied at the same time at the first vaccination even that cost is minimal.

certificates of “good practice” to those households and groups that meet set production, livestock identification, vaccination, and food safety standards<sup>8</sup>.

### ***Subcomponent A2: Piloting of Livestock Planning Zones (LPZs).***

The sub-component would support a pilot program to test the effectiveness of the LPZ development model by financing the establishment, operation, monitoring and evaluation of one pilot LPZs in each of the provinces of Thai Binh, Hanoi and Dong Nai<sup>9</sup>. The beneficiaries of the LPZ program are expected to be progressive farmers. They would be household producers with the capacity to upscale to small or medium scale commercial producers in the medium term. Their participation in the LPZ program would bring their obligation to observe a set of operational guidelines on: vaccination and disease control; improved production practices; and waste management and waste water treatment.

The following activities would be financed under this subcomponent:

- (a) Development of the pilot LPZ: planning and design (including EA instruments), and implementing livestock infrastructure support like construction/upgrading of roads, electricity, water supply and waste water treatment.
- (b) Introduction of services to support GAP (animal production, animal health and bio-security)
- (c) Livestock Identification (as presented in Sub-component A1 above)
- (d) Livestock waste management and bio-securities measures
- (e) Monitoring and evaluation (i.e., production efficiency, bio-security, and financial, economic and environmental sustainability).

Services to participating households. The services to be provided to LPZ household producers to support the implementation of GAP, are outlined below.

Services to farmers would include: increased disease surveillance by district veterinary staff; serological surveys to verify vaccination coverage and detect inappropriate use of antibiotics and growth hormones; controls on the movement of animals; and, feed analysis to verify true labelling of prepared animal feeds. Support would also be provided for the formation of GAP groups to engage in collective bargaining in the purchase of feed and other production inputs and in developing more secure marketing arrangements with livestock traders. Veterinary station staff servicing the LPZs would receive refresher training in preventive disease control and basic epidemiology.

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<sup>8</sup> It is proposed GAHP groups would be assessed on annual basis - both within the commune and between communes - and trophies, T shirts, and similar rewards will be handed out to the best performing groups and individuals.

<sup>9</sup> The criteria for selecting these LPZs and the operational procedures have been included in the Project Implementation Manual. Assurances have been received that the zoning and planning process and the selection of households for participation will be transparent and carried out in close consultation with the households and communities concerned. Land transactions would be by direct negotiation between the parties concerned.

Support to livestock waste management and environmental protection in LPZs would include: (a) technical assessment of waste management needs; (b) incentive payments for the construction of bio-digesters and animal waste management facilities constituting up to 25% of the cost of construction and equipment., (c) initial baseline assessment, ongoing monitoring and final evaluation of the effectiveness of the environmental protection measures. Each of the pilot LPZs would be subject to an Environmental Impact Assessment (EIA) prior to approval for investment.

Evaluation of the LPZ model. A system of data collection and analysis would be supported by the project<sup>10</sup>. The project would finance: (a) the development and implementation of a farm-based recording and reporting system; (b) survey and assessment leading to detailed evaluation of the LPZ model in terms of - production efficiency, bio-security, and its financial, economic and environmental sustainability; and (c) workshops to review the results of the evaluation. If the findings of the evaluation confirm the sustainability of the LPZ concept, the project would support additional LPZs on a case by case basis.

### ***Sub-Component A.3. Upgrading Slaughterhouses and Meat Markets***

This sub-component links GAP in key production areas under subcomponent A1 with improved hygienic slaughterhouses and wet markets in the project provinces along their meat value chains. The subcomponent would support the following:

- a. The upgrading of slaughterhouses;
- b. Improved meat inspection services; and,
- c. The upgrading of meat markets.

Upgrading of Slaughterhouses: Existing slaughter practices are carried out on the floor with little or no consideration for hygiene and safe meat handling. Carcasses are contaminated with waste water effluent and portioned on wooden surface which are impossible to disinfect. Slaughter men are largely unaware of the need for hygienic practices. The project would renovate existing, or construct new slaughter facilities to provide a meat-safe link in the meat value chain covering project LPZs. Items eligible for project's funding include: (a) the design work necessary to bring the facility to an acceptable operational standard; (b) upgrading the water supply; (c) improvements to ante-mortem and post-mortem inspection areas (lighting, inspection pens and quarantine pens); (d) installation of overhead carcass transport rails, or the provision of dressing cradles and hoists necessary to get carcass dressing off the floor; (e) livestock waste treatment facilities<sup>11</sup>; and, (d) materials and equipment necessary for improve hygiene and bio-security (pressure sprays, livestock transport cleaning areas).

Each of these investments would be accompanied by behaviour change training programs conducted by DARD. This training would be designed to change the way in which traders, slaughterhouse management, slaughter men, veterinary inspectors, and the transporters of meat deal with bio-security, disease control, and meat hygiene and food safety. As a condition of receiving assistance each of the facilities supported would be subject to regular

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<sup>10</sup> The PPMU will be responsible for collecting LPZ/farm level data which will be evaluated at DLP at national level

<sup>11</sup> Subsidies would be provided for the installation of waste water treatment systems, and technical assistance would be provided to introduce better water management practices.

inspection to ensure that hygiene standards and safe operational procedures are being maintained.

In the case of privately owned facilities, the project would finance the procurement of essential eligible items of construction or equipment up to a ceiling of US\$ 30,000 per slaughter facility in order to achieve a satisfactory level of meat safety and operational hygiene. The financing of these facilities would be conditional on the owners entering into a binding agreement with DARD to maintain acceptable operational standards in the future and a commitment from DARD to suspend the slaughtering facilities operations in the event that satisfactory operational standards were not being maintained. Facilities that are operated on a community basis or owned by government would be financed fully by the project and the same operational guidelines would apply.

**Improved meat inspection service:** The project would support the comprehensive upgrading of provincial meat inspection services with technical backing from DAH at the national level. In each participating province, the project would finance (a) a review and development of improved operational guidelines and regulations; (b) training of key veterinary meat inspectors at provincial and district levels; (c) essential equipment, laboratory tests of samples taken at slaughterhouses and incremental operating costs for veterinary inspectors<sup>12</sup> to ensure maximum coverage of slaughtering facilities; and (d) upgrading of the reporting system. Particular attention would be paid to ensure that both anti-mortem and post mortem inspections are carried out in a rigorous manner and action is taken when disease or contamination is identified.

**Meat markets:** Meat in existing meat markets is sold from wooden tables or hung from suspended hooks without consideration for cleanliness. Markets cements floors, if present, are often broken and drain poorly. Water supplies for cleaning may be absent. The project would make improvements to participating meat markets by upgrading building structures and floors, improving drainage, introduce water supplies, and meat counters with stainless steel surface to allow cleaning and disinfection. The project would also address market management issues such as: centralizing the cleaning processes; improving inspection services; and training market management and meat stallholders in the hygienic methods of handling meat. The criteria for selecting meat markets to be financed under the project and the hygiene standards expected to be achieved are presented in the Project Implementation Manual

#### ***Sub-Component A.4: Provincial Capacity Building and Monitoring***

This sub-component would improve the capacity of DARD and DONRE to support activities in the project province, including: bio-security; food safety, meat inspection and livestock identification (for DARD) and the design and implementation of livestock waste management systems and the monitoring of environmental pollution caused by livestock waste (for DONRE). Training courses will be provided in waste management, epidemiology, food safety, meat inspection and safe and efficient feeding of livestock. The project provinces will be supported by the national level in waste management, environmental protection, farm bio-security and the assessment of the GAP process. The project would support programs to monitor: (a) pollution caused by livestock waste; (b) safety in the food production and marketing chain; and, (c) the quality and safety of livestock feeds.

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<sup>12</sup> Knives, protective clothing and sampling equipment

The Sub-component also provides for the development and implementation of a public awareness program and a “hot-line” service through which issues relating to food safety, livestock disease control and the meat inspection service can be reported..

### **3.2. Component B: Strengthening Central-Level Livestock and Veterinary Services**

#### **Sub-component B.1: *Strengthening the Capacity of Livestock Production Department***

The subcomponent would support: institutional strengthening; policy development; and, the development of a public awareness and information system, within DLP. These initiatives are designed to assist DLP to fulfil its role in providing technical leadership and implementation support to the provincial programs, including: livestock waste management; the rollout of GAP for household producers; and, procedures to inform producers of feed quality and true branding of prepared livestock feeds.

The Sub-component would provide technical assistance (TA) to support the establishment of a Livestock Environment Division and to strengthen of regulations and standards for livestock waste management. National and international technical assistance would also be provided for policy development and piloting innovative approaches to livestock development planning; breeding quality certification; and true labelling of livestock feed quality.

In addition, TA would be provided to review GAP procedures and establish a certification process for household producers. The system currently being promoted by MARD is very comprehensive and designed to address the needs of large-scale producers with the financial resources to meet much higher standards than the household producers can achieve. The consultant would review VIETGAP and design a system appropriate for the household livestock producer and develop a methodology for monitoring and certification. The consultant would hold training sessions in each of the project provinces to train DARD and commune staff in the implementation of the new GAP certification. Once these systems are in place, DLP is responsible for monitoring and analyzing results and in updating the GAP procedures to meet the changing needs of the livestock industry – particularly the household producers.

DLP’s data collection and dissemination capacity would be upgraded by establishing a public awareness program to disseminate information on food safety but also on livestock and feed markets, bio-security issues, GAP and technical aspects of livestock production, processing and marketing.

In addition, DLP and DAH would both be responsible for developing or updating, guidelines and regulations relating to the key areas of: bio-security; livestock disease control; livestock waste management; the quality of livestock feeds; the sale and use of feed additives; hygiene standards and meat inspection in slaughterhouses; and measures to improve the safety of meat along the production and supply chain until it enters the retail markets. The two agencies would play a crucial role in ensuring meat safety standards are consistently applied and adopted on a nationwide basis, not just province by province.

#### ***Subcomponent B2: Support for DAH enhancing animal disease surveillance and control.***

The subcomponent will support DAH to fulfil its central leadership role in animal health and bio-security within the livestock production and marketing system. Under the Sub-component, the following activities would be financed:

- a. Improving surveillance of livestock disease and food contamination and upgrading of reporting and data processing capacity
- b. Upgrading of meat inspection services and review of training procedures
- c. Strengthen food/meat hygiene monitoring capacity - strengthening National Veterinary Center for Hygienic Control No.1 (Hanoi) and No.2 (HCMC), to measure residues of antibiotics and growth hormones in meat and livestock feeds.
- d. The development and field testing of improve procedures/protocols for: a) livestock identification and trace-back procedures; (b) bio-security measures for household producers on pilot LPZs and priority production areas; and (c) investigation of the occurrence of zoonotic diseases and the measure to counteract them

### **3.3 Component C: Project Management and Monitoring and Evaluation.**

The component would provide the required resources to: (a) enable the project to be effectively managed; and, (b) to strengthen institutional capacity in key areas, particularly at provincial, district, and community levels, to monitor and evaluate project activities and sustain project interventions. It includes two subcomponents: (a) project management; and (b) supports to monitoring and evaluation.

#### **The Additional Financing for LISAF:**

There are no changes proposed in the PDOs, which are *to increase the production efficiency of household-based livestock producers, to reduce the environmental impact of livestock production, processing and marketing, and to improve food safety in livestock product supply chains (mainly meat) in selected provinces*, nor in the project components under this AF. The Project Coordination Unit (PCU) has been successful in implementing the project up to now, including complying with World Bank (WB) policies and guidelines, notably for fiduciary and safeguards aspects. Therefore, the same implementation arrangements will be used for the AF.

#### **Component A: Upgrading Household-based Livestock production and Market**

**Integration.** In addition to scaling up its support to GAHP households, wet markets and small slaughterhouses in the same Provinces than phase 1, the following interventions are proposed to help the project being even more transformative:

- a. **Focusing on groups and cooperatives:** whilst the first phase of the project has already started advocacy for groups' formation, the concept and its added-value are still only partly understood by both producers and extension services. The project will prioritize the development of these groups and cooperatives during the AF as: (i) an entry point for the GAHP accreditation (for sustainability matter, as the current system is not viable both from the HHs' perspective (too expensive) and the accreditor's (too many HHs to inspect) perspectives), and (ii) a way for better access to inputs, TA, markets and a source of income for the cooperative (selling of animal feed, services providers (e.g. through miller and mixer, etc.). This would mean working on curriculum development, training of HHs and extension staff and providing incentive (matching grant / access to credit). The project could strengthen the current GAHP groups through promoting more collective actions within and among the groups to



make them more capable and informed actors in productions, linking with markets as buyers and sellers at the same time. Block grants will be used to finance business proposals developed by the GAHP groups, with support from TA and/or local facilitators. Capable groups, through using effectively the block grants and available TA, will be able to move up the ladder to join the tier of collaborative groups then cooperatives in a stepwise approach.

- b. Helping stakeholders all along the value-chains to establish and consolidate **“productive alliances” or “partnerships”** (contractual relationship), as win-win mechanisms to ensure inputs and markets availability and competitiveness of prices. This would concern maize and animal feeding producers, inputs suppliers, pigs/poultry producers, middlemen/traders, slaughterhouses and markets. Pertinent lessons from the closed Bank-funded Agriculture Competitiveness Project (ACP) will be drawn, in particular to ensure that incremental steps to collective actions are taken, including developing core organizational, management skills and effective governance arrangements first and ensuring that only best organized groups and cooperatives will be involved in building productive alliances with other suppliers’ groups or agri-business companies.
- c. Strengthening wet markets’ management by involving direct beneficiaries, namely the retailers, in the markets’ boards. This would allow addressing better retailers’ priorities, negotiating more sustainable utilization fees and developing transparent markets’ management procedures. In addition to pork and poultry meat markets, the AF will support the rehabilitation and improved management of the buffaloes U Market in Nghe An Province. This market gathers about 3,000 buffaloes from the entire country, Lao PDR and Myanmar every six days to be sold for meat or breeding and disseminated in all provinces. The current situation poses a real threat to animal health and the control of animal diseases is almost impossible given the non-existing infrastructure. The support to this important market will clearly contribute to the PDO and is an economically viable investment that will bring important local revenues to the commune and province.

Finally, it is also important to deal effectively with dead animal and slaughter waste. This farm to consumers for safe meat value chains. LIFSAP and the concerned services of MARD (Department of Livestock Production (DLP) and Department of Animal Health (DAH)) have put in place practical solutions for most critical issues (use of antibiotic or hormones by farmers, disease prevention in farms, animal waste treatment, meat inspection, transport hygiene, etc.). However the aspect of how to handle potentially pathogenic waste (e.g. from dead or culled animals, or from condemned animal by-products) during the slaughter process is not managed in a satisfactory manner.

**Component B: Strengthening Central-level Livestock and Veterinary Services.** Again, the project has already achieved a lot through this component, through successful capacity building and training program (meat inspectors, decentralized staff from DARD, DLP and DAH, etc.), strengthening of the Centre for Testing Livestock Breeds and feeds, development or improvement of key guidelines related to animal diseases surveillance, food safety and good hygiene practices, surveillance protocols and sampling methods, etc., and monitoring of animal diseases prevalence and pathogens/residues in products and effluents.

However, to demonstrate its sustainability and transformative nature, this AF should focus on: (i) fully institutionalize the above-mentioned successes, and (ii) put more emphasis on Policy dialogue and reforms. For the latter, the project would benefit in advocating and supporting MARD in strengthening its collaboration with other line Ministries (Environment, Trade, Technology and Science) but also the civil society: national associations of producers, unions of cooperatives, Veterinary Association, etc. Bringing international expertise on some topics would also benefit a lot the project, the MARD and livestock stakeholders.

Areas where this Policy Dialogue could have strong impact on project's achievement include: (i) groups and cooperatives (legal framework, rights and duties, curriculum), (ii) national environmental standards and their applicability to rural livestock-producing areas, (iii) national standards on animal feeding and breeding, including their enforcement through strengthening the related laboratory network for testing, (iv) enforcement of the legal framework against illegal slaughtering, including communication and public awareness, capacity building and cooperation between agencies, (v) institutionalizing Food Safety standards through in particular reviewing the veterinary education curriculum to include Food Safety, and (vi) veterinary services and animal health.

On the latter, Vietnam already received the evaluation of the Veterinary Services and the subsequent Gap Analysis, as part of the OIE recognized tool *Performance of Veterinary Services* (PVS) Pathway. Results of these analytical works are available to partners and should be used to identify weakness that should be tackled to achieve the PDO. In particular, Vietnam is currently reviewing its Animal Health Legal Framework to make it compliant with international standards. The OIE has already conducted a mission to start helping the country in this initiative. Similarly, there is no independent "Veterinary Statutory Body" (VSB) in the country and the relations between the public Veterinary Authority and private veterinarians are limited. The Veterinary Association of Vietnam should play a role to reinforce this area. Such an innovative project would facilitate efforts to establish the VSB and to pilot initiatives aiming at delegating some tasks of public good nature to private veterinarians through the so-called "sanitary mandate". International expertise from the OIE during the extension phase could help the project undertaking this soundly.

With the close of the Viet Nam Avian and Human Influenza (VAHIP) in June 2014, to anticipate any future outbreaks this project will include a new sub-component for an emergency response to any trans-boundary or zoonotic diseases affecting pigs and poultry, therefore threatening the project's ability to achieve its development objective. It is anticipated that this sub-component will have a zero allocation. Following a disease outbreak's suspicion or confirmed event that may cause a major threat to public health or drop in livestock competitiveness, the Government of Vietnam may request the WB to re-allocate project funds to support early and rapid mitigation, response, control and recovery from this outbreak. This component would draw resources from the unallocated expenditure category and/or allow the GoV to request the WB to re-categorize and reallocate financing from other components to partially cover emergency response and recovery costs. This component could also be used to channel additional funds, should they become available as a result of an eligible emergency. Detailed operational guidelines acceptable to the WB for the implementation of the Contingency Emergency Response sub-component under LIFSAP will be prepared as a disbursement condition. All expenditures under this sub-component, should it be triggered, will be in accordance with paragraph 11 of OP 10.00 of the Investment Project Financing and will be appraised, reviewed and found to be acceptable to the WB before any disbursement is made.

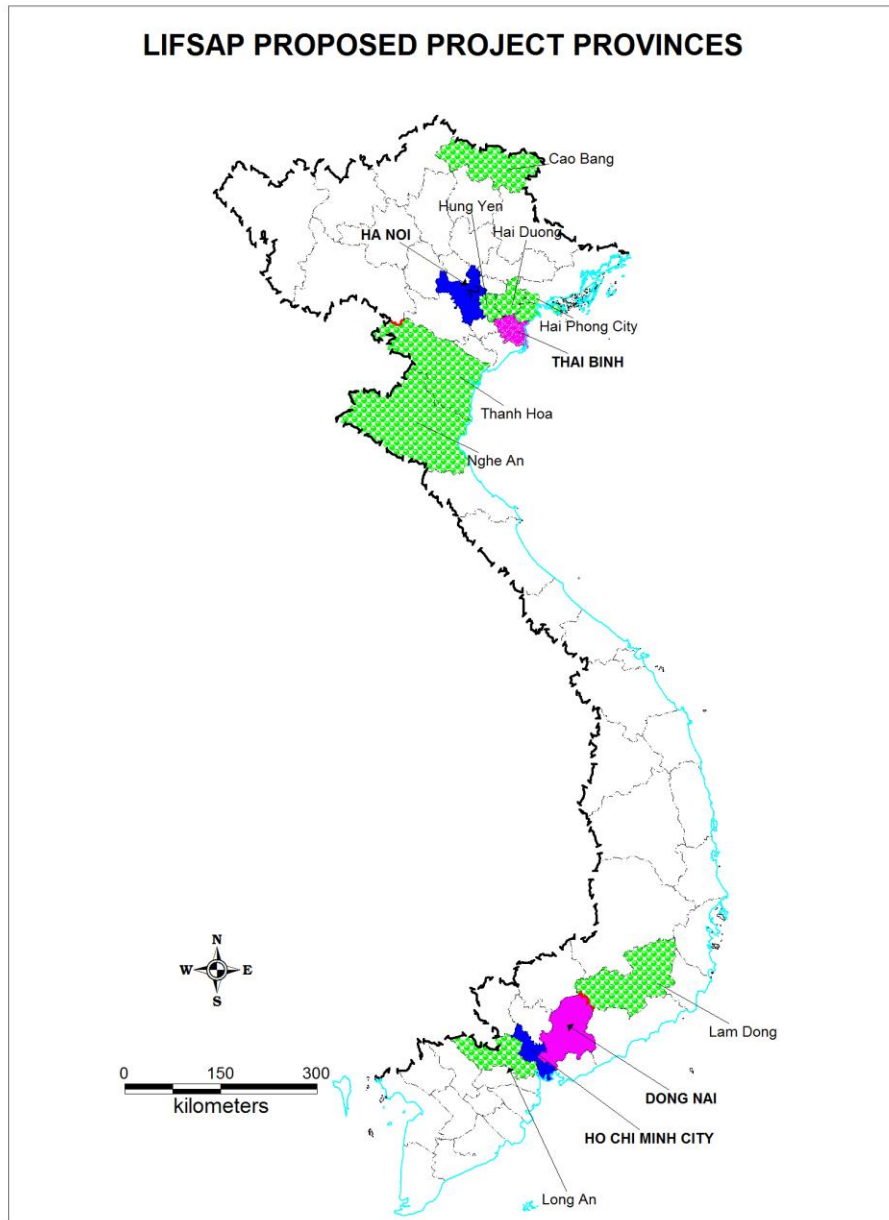
**Component C: Project Management.** Being such an innovative project in the Vietnamese context, international expertise to bring advice and technologies from elsewhere remains crucial. The possibility of extending the working collaboration with ILRI will be investigated to ensure the project's success and maintain the current high standard of results monitoring and impacts assessment.

In addition, the communication strategy would need to be reviewed, updated and maintained to adapt itself to implementation progress, as well as to targeted beneficiaries (GoV, donors and partners, value-chains' stakeholders and consumers in particular)

#### **IV OVERVIEW ON THE PROJECT AREA AND PRODUCTIVE SECTORS OF THE PROJECT**

The Ministry of Agriculture and Rural and Development selected and proposed 12 provinces to participate in the LIFSAP including Cao Bang, Ha noi, Hung Yen, Hai Duong, Hai Phong, Thai Binh, Thanh Hoa, Nghe An, Lam Dong, Dong Nai, Ho Chi Minh city and Long An. Four cities and provinces namely Ha noi, Thai Binh, Ho Chi Minh city and Dong Nai will participate in the first phase of the Project.

The Figure 1 presents the proposed provinces selected to participate in the LIFSAP:



**Figure 1 Locations of LIFSAP provinces**

#### **4.1 Vietnam**

Vietnam has a total land area of 331,040 km<sup>2</sup>. Administratively, the country is divided into 65 cities and provinces. Hanoi is the capital city while Ho Chi Minh City has been the country's top economic centre. Pigs have been raised traditionally in Vietnam for so long a time. The Pork occupied the highest proportion of animal meat in the daily meals of the Vietnamese people, and from 2001, the Pig production has grown up twice after 10 years. In the period of 2001-2006, the number of slaughtered pigs and sows increased quickly with the annual rate of 5.9% and 7.7%, respectively, leading to pork production which has been increasing by 10.9% per year. After 2006, production became slower primarily because of continuous disease outbreaks. In 2013, the total number of pigs on recording Vietnam is 26.3

million of which the number of sows is 3.91million; the estimated pork production is about 3.22 million tons (Livestock Production Department MARD,2014).

Vietnam ranks as the world's 5<sup>th</sup> biggest in terms of the total number of pigs and the 6<sup>th</sup> in terms of live weight of pork production. However, pork products are mainly used for domestic consumption, and its export value is not considered significant. Pig production in Vietnam is mainly comprised of three systems, they are: (i) small-scale householders with low level of hygiene; (ii) small-scale commercial pig producers with minimum hygiene standards; and (iii) large scale commercial pig producers with high hygienic standards. At present, about 70% of pig heads and 60% of pork products are produced by the small-scale householders. The large-scale commercial pig producers with high hygienic standards supplied only about 15% of the total pig products in the market<sup>13</sup>.

Poultry population has been rapidly increased from 248,3 million heads in 2008 to 314,7 million in 2013, with an average increase of 4,9%/ year. The biggest poultry population is in the Red River Delta with 85,4 million heads, accounting for 27,1% of the total poultry of the country, followed by the Mekong River delta with 58,7million, accounting for 18,7%; the North-East of 54.2 million accounting for 17,2%; the Central-North of 41,2 triệu, 13,1%; South-East of 29,1 million, 9,2%; Central Coast of 20,3 million, 6,5%; Central Highland of 14,4 million, 4,6%; and North-West of 11,6 million, 3,7%. The following table shows the pig and poultry population and the production of meat.

Livestock number (mil. heads) and production (mil. tons)

Year	Pig		Poultry		Total production
	Number	Production	Number	Production	
2005	27.4	2288.0	219.9	322.0	
2006	26.9	2505.0	214.6	344.0	
2007	26.6	2663.0	226.0	359.0	
2008	26.7	2783.0	248.3	448.0	
2009	27.6	3036.0	280.2	528.0	
2010	27.4	3036.0	300.5	621.0	
2011	27.1	3099.8	322.6	702.4	
2012	26.5	3161.8	308.5	736.1	
2013	26.3	3218.7	314.7	753.7	
2017				95414	
2020	35.0		<400		7000

Source: Vietnam General Statistics Office, 2014

It is estimated by MARD that the meat consumption grows yearly by the year 2020 at 2.9 percent, from which, pork at 2 percent, poultry 5 percent and cattle/buffalo 11 percent. Until 2020 the per capita consumption of pork is expected to increase from 32 kg to 48.7 kg. This is due to an expected increase of the purchasing power of the population. In fact, the middle and affluent class in Vietnam is expected to more than double in size between 2014 and 2020 from 12 million to 33 million not only in the two major economic centers of Hanoi and Ho Chi Minh City but also in other provinces. By 2020, Vietnam's average per capita income shall

<sup>13</sup> These are defined under LIFSAP as those have livestock as their major source of income and the family is providing the majority of the labour required for the enterprise.

<sup>14</sup> Vietnam Agribusiness Report Q1 2013 preview for 2016/2017

rise from US\$1.400 to US\$ 3.400<sup>15</sup>. However, not only the total quantity of meat to be consumed will raise but also the demand for safe food will increase. In the future, the livestock industry should focus therefore as much on improving the quality as on boosting the quantity of meat production.

Below is some information about the cities and provinces participating in LIFSAP.

## 4.2 Hanoi Capital

Ha Noi is located along the banks of the Red river. From 1 August 2008, the city has been expanded to cover the entire former Ha Tay province, Me Linh district of Vinh Phuc province, and four communes of Luong Son district, Hoa Binh province. Ha Noi is located in the Red River Delta, from 20<sup>0</sup>23' to 21<sup>0</sup>23' North and 105<sup>0</sup>15' to 106<sup>0</sup>03' East. Ha Noi is bordered with Vinh Phuc and Thai Nguyen provinces to the North, with Ha Nam and Hoa Binh provinces to the South, with Bac Giang, Bac Ninh and Hung Yen provinces to the east, and with Hoa Binh and Phu Tho to the West. Hanoi covers an area of 3.3 millions square kilometers, with a population of 6.23 million people. National highway No.1 runs from Hanoi to Ho Chi Minh City, highway No. 6 joins Ha Tay with North-Western part of the country.

Based in *Department of Agriculture and Rural Development, in 2014, the pig population is about 1,378,880 heads and the poultry population is about 25,111 thousand of which 15,408 thousand are chickens.*

Number of districts and communes involved in the project

No.	GAHP district	GAHP commune	participating in
1	Chương Mỹ	1. Hoàng Văn Thụ 2. Hồng Phong 3. Hữu Văn 4. Trung Hòa	2012 2012 2012 2013
2	Thanh Oai	1. Đỗ Động 2. Hồng Dương 3. Liên Châu	2012 2012 2012
3	Thường Tín	1. Lê Lợi 2. Nghiêm Xuyên 3. Tô Hiệu	2012 2012 2012
4	Quốc oai	1. Cấn Hữu 2. Đồng Quang 3. Thạch Thán	2012 2012 2012

Eight districts are expected in the GAHP expansion phase, in which 04 GAHP districts are expected to develop during the period 2015-2018: 1. Ung Hoa district; 2. Soc Son district; 3. Dan Phuong District; 4. Phu Xuyen District

## 4.3 Thai Binh Province

<sup>15</sup><http://www.amchamvietnam.com/30443067/vietnams-middle-class-set-to-double-by-2020-bcg/>

Covering an area of 1,542 km<sup>2</sup>, Thai Binh makes up 0.5% of total land area of Vietnam. Thai Binh is located in a flat area (slope<1%). Population is estimated at 1,827,000 people, among which rural population accounts for 94,2%. Population density is 1,183 people/km<sup>2</sup>. The province borders within the Gulf of Tonkin to the east, with Nam Dinh and Ha Nam provinces to the south and southwest, with Hai Duong, Hung Yen to the northwest, and with Hai Phong City to the north. Thai Binh is located in the Red river delta and is close to the northern focus Hanoi - Hai Phong - Quang Ninh economic triangle. According to Bureau of Statistics on October 1, 2013, Thai Binh has a total pig population around 1,009,089 heads, 10971 millions of poultry population, including 8,112 million chickens. The value production is estimated at VND 2,177.988 billion, which increased 6.79% over the 2012. The participating districts in the project are Quynh Phu, Dong Hung, Kien Xuong and Vu Thu.

#### **4.4 Dong Nai Province**

Dong Nai is a south – eastern province of Viet Nam, with an area of 5,894.73 km<sup>2</sup>, accounting for 1.76% of the nation natural area or 25.5% of the South - eastern natural area. Population to the 2006 is 2,254,676 with a density of 380.37 people/km<sup>2</sup>. It has 11 dependent administrative units. Dong Nai is situated on the economic hub of southern Viet Nam and bordered by: East by Binh Thuan Province; North-east by Lam Dong Province; North-west by Binh Duong and Binh Phuoc Provinces; South by Ba Ria-Vung Tau Province; and West by HCMC. Dong Nai province has an advantage traffic system with many backbone national roads crossing such as: National route 1A, national route 20, National route 51, North – South railway lines.

Besides, Dong Nai Province is based essentially on the system of lakes, dams and rivers, of which Tri An Lake with 323 km<sup>2</sup> and over 60 rivers, rivulets and canals are very favourable for the development of a number of aquatic products: raft – bred fish, bred shrimps. Dong Nai Province has a river density of about 0.5 km/km<sup>2</sup>, but unevenly distributed. Most of rivers and springs are concentrated in the northern region and along the Dong Nai River in the south – western region. The total quantity of water is fairly high: 16.82 x 10<sup>9</sup> m<sup>3</sup>/year, which accounts for 80% in the rainy season and 20% in the dry one. Rivers are Dong Nai, La Nga, La Buong, Song Ray, Song Xoai, Thi Vai. As reported by Dong Nai DARD, in the first 6 months of 2013, a total pig population of the province is estimated at 1.4 million, increased 7.7% and the total poultry population reached more than 12 million, an increase of 23.22% compared with end of 2012.

#### **4.5 Ho Chi Minh City**

Ho Chi Minh City is located at 10°45'N, 106°40'E in the south-eastern region of Vietnam. Ho Chi Minh city is 1,760 km south of Hanoi. The average elevation is 19 meters above sea level. It borders with Tay Ninh and Binh Duong provinces to the north, Dong Nai and Ba Ria-Vung Tau provinces to the east, Long An Province to the west and the South China Sea to the south with a coast of 15 km in length. The city covers a land area of 2,095 km<sup>2</sup>, extending up to Cu Chi district and down to Can Gio on the East Sea coast. Like Dong Nai, the climate is characterized with two distinct seasons. The rainy season, with an average rainfall of about 1,800 mm annually (about 150 rainy days per year), usually begins in May and ends in late November. The dry season lasts from December to April. The total pig population of HCMC is 370,027 heads. Total livestock farming households is 8,133 (according to HCMC PPMU in the Mission report 8).

#### **4.6 Cao Bang Province**

Cao Bang province is located in the north east region of Vietnam, bordered with Quang Tay province of China to the north (border line is 311 km long). The province is bordered with Tuyen Quang and Ha Giang to the west, with Bac Kan and Lang Son provinces to the south.

Cao Bang has a total land area of 6,690 km<sup>2</sup>, mostly limes stone mountain mixed with earth hills. The average elevation is 200 m above sea level and higher near the border with China. The province has many dense forests. Administratively, Cao Bang comprises of 13 districts with 189 communes, wards and towns.

According to the livestock survey on 1/10/2013, the Cao Bang's pig population is around 381.21 thousand heads (excluding suckling pigs) and the total poultry population is around 2263.98 thousand (Source: Cao Bang DARD, 2014).

#### **4.7 Hai Duong Province**

Hai Duong province is located in the Red River Delta. The province is bordered with six provinces and cities namely Bac Ninh, Bac Giang, Quang Ninh, Hai Phong, Thai Binh and Hung Yen. The province has a developed transport system comprising of railway, waterway, national and provincial highway.

According to 2013 statistics, the number of livestock farms increases rapidly, the number of livestock households decreased. There are 490 farms, 5,201 livestock households.

The buffalo and cow population decreases 6% and 5.9% respectively; pig population increases 0.9% (5,272 heads), poultry population (chicken, duck, geese) increases 0.5% (49,000) compared with the same period of the previous year.

The GAHP areas in project: Kinh Mon district (Hien Thanh Commune, Long Xuyen, Thai Thinh), Cam Giang district (Tan Truong, Hoang Cam, Cam Vu Thach Loi), Ninh Giang District, (the Dong Tam, United Power, Vinh Hoa, Hong Thailand, Hong Du), Thanh Ha (Thanh Lang commune, Lien Mac, Thanh Binh, Thanh Hai).

#### **4.8 Hung Yen Province**

Hung Yen province has a natural land area of 932 km<sup>2</sup> and a population of 1.1 million people in 2008. The province share border with five cities and provinces including Ha Noi, Bac Ninh, Hai Duong, Ha Nam and Thai Binh.

In recent years (2010-2013), the livestock industry of Hung Yen had a rapid growth in productivity, quality, scale and efficiency. The average rate is 4.5% per year.

According to statistics on 1/10/2013, the total pig population is around 619,271 heads, buffalo and cow population is around 40,330 heads and poultry population is 8,303,220. The breed quality continues to improve, lean content of pigs reaches 68%, the hybrid cow accounts for 98%, high quality cows accounts for 20%.

The GAHP areas include Van Giang, Van Lam, Tien Lu, Khoái Chau district.



#### 4.9 Hai Phong City

Hai Phong is a coastal city located at 102 km north of Hanoi. Hai Phong City has a total land area of approximately 152 ha. Hai Phong city is bordered with Quang Ninh Province to the north, with Hai Duong and Thai Binh provinces to the west and the south, respectively, and with the East Sea to the east. Hai Phong City has a dense river system with density from 0.6 – 0.8 km/km<sup>2</sup>.

According to Hai Phong Bureau of Statistics, up to May 2014, the total buffalo population is 7,261 heads, total cow population is 13,991 heads, the total pig population is 460,935 heads and poultry population is 6,352 heads, in which is 5,035,000 chickens.

#### 4.10 Thanh Hoa Province

**Thanh Hoa** is located at 150 km south of Hanoi, border with the east sea and three provinces. Administratively, the province comprises of Thanh Hoa City, two district towns namely Bim Son and Sam Son, and 24 districts.

The province has a population of 3.67 million people. Total land area is approximately 1.1 million ha. Topographically, the province is divided into three regions:

- mountain (elevation from 600-700 m) and hilly areas (elevation from 150 - 200 m) accounts for 75.4 % of total land area
- flat plains intervened with limestone mountains, account for 14.6% total land area
- coastal plains with elevation averaged from 3 to 6 m runs along 102 km coastal line and account for 10% total land area

Thanh Hoa is located in area with annual rainfalls of 1,600 – 2,300 mm. There are 90 – 130 rainy days each year. Water resource is abundant with four major river systems including Hoat, Ma, Chu and Yen rivers. The province has 484,000 ha of forested land which accounts for 44% total land area. Forests are biological diverse.

The total pig population is 887.6 thousand heads, increasing 3.8% over the same period in October 1, 2012. Pig breeding in the province is at small scale of households. In which, the households (with below 30 pig heads) in rural area have 675.9 thousand heads, accounting for 76.2% and the households in urban area has 13.6 thousand heads, accounting for 1.5%; household-based farms (over 30 pig heads) have 79,700 heads, accounting for 9% and there are 51,3 heads/ household-based farms on average. The total poultry population is 18.07 billion heads, up 1.6% over the same period in the previous year (in which, the increasing rate is 2.6% at the delta area, 1.6% at mountainous area and 0.3% at the coastal area) (*Source: Thanh Hoa DARD, 2014*).

#### 4.11 Nghe An Province

Nghe An is bordered with Thanh Hoa in the North with similar physical and climate conditions. Topographically, the province is lowered from northwest to southeast, hills and mountains account for 83% of total land areas. Nghe an has approximately 745,000 ha of forested land. Statistics of first 6 months of 2013 show that the total pig population reached 1,038,792, an increase of 0.07% (758 ) on the same period of 2012. Total chicken population

reached 17,178 thousand, an increase of 6.42% (+ 1036 thousand chickens) compared with the same period of 2012. (Sources: Nghe An DARD, 2014).

#### **4.12 Lam Dong Province**

Lam Dong province has three highlands which are upstream of seven large river systems. Topographically, the province comprises of mostly high mountain intersected by flat valleys. Average elevation is from 800 to 1000m. Total land area is 9,772 square kilometers. The province has 199 farms. There are more large-scale farms such as the chicken farm with over 15,000 heads, pig farms with 1,000 heads. The proportion of livestock industry tends to increase (the structure of the agricultural sector in 2013: cultivation 82.8%, livestock 15%, services 2.2%)

#### **4.13 Long An Province**

Long An province is bordered with Ho Chi Minh City and Tay Ninh City to the south, with Cambodia to the north, with Dong Thap province to the west, and with Tien Giang province to the south. Long An is affected by irregular semi tidal from the East sea through the estuary of Soai Rap river. According to the statistics in 2013, the total pig population was 259,228 heads in which the number of sows is 34,848 heads, hogs: 226,689 heads, boars: 43 heads, the estimated carcasses is 21,464 tons. The chicken population is 5,641.5 thousand heads, duck population is 2,444.9 thousand heads and the total production is 72,838 tons of meat, 152,760 thousand eggs (according to the statistics in 2013). In the 04 GAHP areas of the project include 12 communes in 04 districts: Chau Thanh, Tan Tru, and Giuoc Duoc.  
+ Chau Thanh District: 12 groups: Cong Vinh, Phu Hoa, Binh Quoi Commune  
+ Tan Tru District: 8 groups: My Thanh, Tan Lac, Binh Lang Communes  
+ Can Duoc District 10 groups: Tan Lan, Tan Trach, My Le Commune  
+ Can Giuoc District 80 groups: My Loc commune, Hau Phuoc, Phuoc Lam

It is expected to expand 03 more GAHP areas consisting of 16 groups with about 320 households in 08 communes of Duc Hoa district, Duc Hue district and Tan An town.

- + Duc Hoa District: 06 groups: Duc Lap Ha, Tan My, My Hanh Nam Commune
- + Duc Hue District: 06 groups: My Thanh Dong, Bac Binh Hoa Commune and Dong Thanh town
- + Tan An City: 04 groups: Loi Binh Nhon commune, Binh Tam.

## **V. POTENTIAL ENVIRONMENTAL IMPACTS RELATED TO PROJECT ACTIVITIES**

In order to organise the EMF, the activities defined which may be screened for further environmental assessment, are:

- Category I activities – Piloting of LPZs
- Category II Activities- Livestock Infrastructure Support
- Category III Activities - Non-construction investment

The potential impacts related with these activities are described below:

### **5.1 Category I activities – Piloting of LPZs**

The concentration of livestock in one area will cause significant risks to the quality of water, soil, air, bio security and disease control. However, LIFSAP does not directly invest on livestock production in LPZs but will pilot partial investments on infrastructure for this area. During project implementation, the required EA instruments (EIA, EMP or ECP) will be developed for each specific LPZ in order to ensure that the investment in LPZs meets the requirements of environmental protection laid down by the regulations of Vietnam as well as the triggered safeguard policies of the World Bank.

#### **5.1.1. Potential impacts related to the Category I activities – Piloting of LPZs**

Environmental impacts related to livestock activities in the LPZs might be:

- Causing soil and water pollution due to wastewater and livestock waste containing high level of nutrients and bacteria
- Livestock emissions causing the greenhouse effect. According to FAO report, livestock waste in worldwide create 65% of nitrogen dioxide in the atmosphere; these gases have the ability to absorb solar energy 296 times higher than CO<sub>2</sub>. In addition, the livestock also emit methane and CO<sub>2</sub> causing greenhouse effect
- Ammonia and hydrogen sulfur gases emitted from livestock waste decomposition process have an odor, toxicity can cause harm to the community and affect people's health.
- The high risk of disease transmission from animals to humans
- Centralized waste in LPZs will lead to the development of flies
- Using veterinary drugs can lead to a number of risks for humans and animals.
- Animal feed or veterinary medicine containing harmful ingredients can affect consumers' health

The above risks will be higher when:

- The sitting of the barns and constructions for wastes and wastewater treatment are not proper or not in accordance with the land use planning of the locality. Then, there might be possibility that the places of higher environmental importance such as natural habitats, protected forests or wetlands will be more prone to invasion. If the livestock

areas are too close to residential areas or other welfare centers, disease control will become more difficult.

- Manipulation by hand while handling animal waste without the use of labor protection.
- Livestock sectors are in serious flooding areas. When flooded, the pollutants in livestock dung and urine can spread faster and wider. At that time, environmental pollution control will be more difficult. This risk can occur for livestock farming located too close to rivers or other water sources
- Animal Disease outbreak: At that time, cattle are more susceptible to disease and death risks while environmental pollution and its impacts to human health caused by dead animals would also be very high if the control measures are not fully implemented in time
- Livestock development is not accompanied with the appropriate technical solutions about treatment of water waste, livestock waste, and odor.

The above impacts were carefully considered during constructing LIFSAP.

### **5.1.2. Environmental Measures**

A number of measures have been provided to manage risks and mitigating environmental impacts: :

- Initially only supports LPZ in pilot form.
- Support the planning process of LPZs and establishment of EIA / Environmental Management Plans
- Support infrastructure in order to improve sanitary conditions and / or water waste, livestock waste.
- The project includes activities to raise awareness and environmental management for the project implementation units and farmers.
- Enhanced bio-security through vaccination, surveillance and disease control
- Training the relevant units about disease control, raising awareness about food safety, supporting for analysis of animal feed ingredients

The Annex B.2, Attachment 1, includes proposed measures to prevent and mitigate the environmental impacts described above.

### **5.2 Category II Activities- Livestock Infrastructure Support**

Infrastructure can be supported by LIFSAP project are:

- Upgrading access road, power lines, water supply or drainage system, livestock waste treatment facility
- Upgrading warehouse, providing equipment for slaughters, upgrading access roads or providing some equipment to improve slaughter hygiene and improving wastewater treatment system of the slaughters
- Improving wet or meat markets, upgrading or renovating as re-roofing market, improving electrical systems, water etc.

### 5.2.1. Potential impacts related to the Category II activities

The environmental impacts related to these activities are predicted and presented for Pre construction, construction and Operation Phase, in Table 1, 2 and 3, presented below:

#### Pre-Construction Phase:

During this phase, the main activities and the sources of the impacts will be:

- Land clearance if it is necessary
- Arranging the construction site

**Table 1 Environmental impact due to small scale infrastructure: Pre construction Phase**

	<b>IMPACT</b>	<b>DESCRIPTION</b>
1	Land acquisition	Construction of infrastructure projects may lead to changes in land use temporary or permanently. This change may disturb the household economy, incomes and livelihoods of the affected people. The level of impact will depend on: <ul style="list-style-type: none"> <li>- The land area to be acquired</li> <li>- The number of people/households to be affected</li> <li>- Existing land use conditions</li> </ul>
2	Loss of vegetation cover	Clearing vegetation can occur when implementing constructions <ul style="list-style-type: none"> <li>• Electricity supply: in electricity post / substation. Trees within safety areas can also be cut the tops or cut off</li> <li>• Water supply system: Vegetation covers in the construction, focal constructions, the distribution pipelines and water treatment plants. Clearing vegetation increases the potential soil erosion and increase the dust in the air at the construction areas.</li> </ul>
3	Disruption of some existing services	The upgrade of roads and the construction of water supply and electricity supply can lead to a temporarily disruption in order to relocate infrastructures of electricity, telephone etc.

#### Construction phase

During the Construction phase, the main activities and sources of impacts will be:

- Operation of camps
- Operation of equipment and vehicles
- Excavation
- Rehabilitation and upgrading warehouses, slaughters
- Rehabilitation and upgrading access roads
- Improving wet markets, upgrading or renovating as re-roofing market

**Table 2 Environmental impact due to small scale infrastructure: Construction Phase**

	<b>IMPACT</b>	<b>DESCRIPTION</b>
1	Air pollution	Smoke and dust from construction site and surrounding areas, including along the roads used for construction materials and construction waste transportation will be able to influence local air

		<p>quality in the region</p> <ul style="list-style-type: none"> <li>- The smoke from the exhaust pipes of machinery and vehicles construction and from the other vehicles involved in construction activities.</li> <li>- Increase the dust along the route used for construction materials and wastes</li> <li>- Dusts from temporary loading of granular construction materials</li> <li>- Dusts from construction waste dumping sites</li> </ul> <p>This impact occurs in a relatively short time with a small degree of impact, causing discomfort to the affected person and daily lives of some people. The level of impact depends on:</p> <ul style="list-style-type: none"> <li>- The number and frequency of vehicles in use</li> <li>- The quantity of granular materials to be temporarily loaded at a time</li> <li>- The size of the granular materials</li> <li>- Weather conditions</li> <li>- Toxicity of the materials</li> <li>- The duration that granular materials is exposed freely to the air</li> <li>- The number of people /objects affected</li> </ul>
2	Increase of noise and vibration levels.	<p>The sources of increase noise level and vibration level are:</p> <ul style="list-style-type: none"> <li>- Engines of running vehicles, construction plants operating</li> <li>- Construction activities such as piling, excavation or installation of equipment, loading of construction materials, concrete pouring, drilling</li> </ul> <p>Noise and vibration usually occur in a short time, but if it occurs in sensitive time, it can adversely affect people's sleep, making it difficult for the listener. If noise occurs relatively long, it can make some people a headache.</p> <p>The scope of impacts depends on:</p> <ul style="list-style-type: none"> <li>- The number, frequency and working durations of noise sources</li> <li>- Time of the day (night time)</li> <li>- The based noise and vibration level</li> <li>- The level of noise sensitivity of the receivers</li> </ul>
3	Water pollution	<p>The potential impact of construction activities on water quality are the increase of the turbidity of the effluent and the modification of the chemical and physical characteristics of the water in rivers, lakes or another water body.</p> <p>The sources of water pollution are:</p> <ul style="list-style-type: none"> <li>• Discharge or leakage of grease during the construction process due to the maintenance of the equipment or by accident.</li> <li>• Discharge without treatment of wastewater from the Construction camp.</li> <li>• Discharge of solid waste from the construction camps into the</li> </ul>

		<p>water bodies.</p> <ul style="list-style-type: none"> <li>• Discharge of spoil and other materials.</li> </ul> <p>The level of impact will depend on the amount of pollutants, sediments in the water, diluting ability of the receiving water source, using purpose of water resources and the value of contaminant concentration that aquatic species can adapt to survive.</p> <p>For public water supply using groundwater, quality of the well's pipe and the plaster to create separation on the hydrogeology with other water source plays a very important role in preventing groundwater contamination. If the construction quality is not good, surface water will be contaminated or groundwater from the upper layer can run into exploiting layer and make the exploiting groundwater pollution</p>
4	Generate Solid waste	<p>Sources of the Solid waste: In general the excavation from construction would generate solid waste or spoil During the rehabilitation and upgrade activities, there will be also solid waste with different components like bricks, glass, wood, etc. The construction camps will generate domestic solid waste.</p> <p>These wastes should be gathered outside the construction areas Depending on the nature of the wastes, they can cause discomfort due to odour or leakage, becoming shelters for wildlife vectors such as rats, cockroaches</p> <ul style="list-style-type: none"> <li>- An inadequate disposal of waste, increases the likelihood of soil erosion and water pollution.</li> </ul>
	Soil pollution	<p>The potential impact of construction activities on soil quality is modification of the principals characteristics of the soil:</p> <p>The sources of soil pollution are:</p> <ul style="list-style-type: none"> <li>• Discharge or leakage of grease during the construction process due to the maintenance of the equipment or by accident.</li> <li>• Discharge of wastewater from the Construction camp, without treatment, on the soil</li> <li>• Disposal of domestic solid waste from the Camps.</li> <li>• Discharge of spoil and other materials in areas which are not defined.</li> </ul>
5	Soil erosion	<p>The sources of soil erosion are:</p> <ul style="list-style-type: none"> <li>• The construction of the roads, of power supply or water supply, or other infrastructure projects, especially during the clearance and excavation activities, affect the cover vegetation and it results in soil erosion process.</li> <li>• The exploitation of borrow pits and the clearance of the area may also cause soil erosion.</li> </ul> <p>Risk of soil erosion is higher in slope areas and heavy rain conditions.</p>

6	Cause disturbance to traffic and daily activities	<ul style="list-style-type: none"> <li>• Road upgrading, excavation for drains, pipes installation and electrical wires may disturb traffic.</li> <li>• Access and business may be disturbed when the works are carried out at wet market</li> <li>• Transportation of heavy/bulky equipment may cause obstructions to local traffic</li> <li>• The transportation of heavy or bulky equipment can damage roads, especially bad roads</li> </ul>
7	Safety and health of the public	<ul style="list-style-type: none"> <li>• Transportation of heavy/bulky equipment may increase safety risks on roads.</li> <li>• Construction sites, especially in areas where excavation is conducted, and in locations where heavy construction machinery is used, increase the risks of accidents.</li> </ul>
8	Occupational health and safety of workers	During construction implementation, workers are hard to avoid the risks related to health and safety. In particular, the following activities should be considered: excavations; working with heavy equipment; working in confined spaces; working on and along traffic roads; heavy lifting; storage, handling and use of dangerous substances and wastes; working under noisy conditions.
9	Involve chance findings- heritage, archaeology, cultural objects	Assess the possibility that during works being carried out at the sites or borrow pits, objects having archaeological / cultural or religious values or explosive materials in war time may be discovered
10	Social Disturbance	The concentration of non local workers would cause social disturbance to the stability of local's social settings and increased the risks of social evils such as gambling or prostitutions.

### Operation phase

During the operation phase the main activities and sources of impacts will be:

- Operation of the roads

**Table 3 Environmental impact due to small scale infrastructure: Operation Phase**

	IMPACT	DESCRIPTION
	<b>Road</b>	
1.	Air pollution and increase in noise	The increase in dust, smoke and noise along the constructed roads is unavoidable. However, the upgraded roads are all in the planning area for livestock development, far away from residential areas and other environmental- sensitive objects, so the effects are considered minor and controllable.
2.	Safety and health of the public	The number of vehicles in the region will increase and may affect the safety of residents in the area. However, this impact can be controlled by setting speed limit through traffic adequate signage.



### 5.2.2. Environmental Measures

The Annex B, Attachment 2, listed the common mitigation measures to consider for civil works. This Annex has to be considered when the EMP/EPC has to be elaborated.

In Slaughterhouses and wet Markets, the Annex B, Attachment 3, propose also mitigation measures for these works.

### 5.3 Category III Activities - Non-construction investment

The non-construction investment may include:

- Vaccination and support for veterinary services
- Meat sampling and analysis in laboratory
- Animal Feed Analysis

#### 5.3.1. Potential impacts related to the Category III activities

The table below summarizes the potential impacts related to these activities:

**Table 4 Environmental impact related to the provision of good and service  
(Vaccination/Sample and Analysis)**

	<b>Impacts</b>	<b>(Description)</b>
1	Public health affected	<p>Bottles of vaccine and unused vaccine may contain pathogenic bacteria.</p> <p>On the outbreak of the disease, improper disposal of waste and materials will accumulate germs that may cause disease. The bacteria are potential threats to animals.</p>
2	Risk of the health of the commissioner taking sample and analysis	<p>Contacting animals and samples during taking samples and analysis process may exist risks of the vets' health related to diseases transmitted from animal to human.</p> <p>In the process of vaccination or taking sample and analysis, if the process is not carried out properly, Department of Veterinary Medicine and farmers may breathe in the dust contaminated by vaccines or infectious samples</p> <p>Commissioner who contacts with animals (while vaccination or control slaughter) may have a higher risk of occupational diseases.</p> <p>Unpredictable reactions of the animal during the process may cause danger to the vet or farmer if the process is not carried out properly (for example, a 300 kg cow might step or crush or injure any person nearby when being injected).</p>
3	Hazardous Waste from the lab	<p>Analysing the infectious sample may generate waste such as:</p> <ul style="list-style-type: none"> <li>- Unused vaccine, plates, and related tools.</li> <li>- Animal liquid waste, including blood and body fluid</li> </ul>

		<p>except urine and materials contaminated by blood or body fluids.</p> <ul style="list-style-type: none"> <li>- . Sharp tools: non-contaminated and contaminated needles, syringes, scalpels, surgical instruments, and intravenous tubing with needles attached.</li> <li>- Blood (liquid or dry) or other potential infectious materials.</li> <li>- Waste contains germ: organs, cells, body parts except teeth, body fluids extracted from cells.</li> <li>- Waste contaminated by animals contacting with infectious factors, animals which use for study.</li> <li>- body parts release blood or infectious materials in liquid or solid if compressed</li> <li>- body parts contain dry blood or infectious materials which are capable of such substances emitted during operation</li> <li>- Sharp tools including infectious tools which may go through skin.</li> <li>- Waste contains germ and bacteria contains blood or other potential infectious materials.</li> </ul> <p>The waste mentioned above may cause the risk of public health if they are not properly administered.</p>
4	Occupational health and safety of lab workers	Infection occurs when a large number of bacteria enter into human body by a certain way (mouth, skin, eyes, and lung) and defeat the immune system.

### 5.3.2. Environmental Measures

The Annex A, Attachment 4, propose guidelines of environmental measures to consider during the EMP/EPC elaboration.

The guidelines to mitigate the impacts due to non structural activities consider:

- Biosafety rules
- Lists of drugs, chemicals, antibiotics banned for veterinary uses: the activities has to consider that they are not allowable to use drugs or chemicals banned in Vietnam.
- List of drugs, chemicals, antibiotics limited for veterinary uses
- Mitigation measures applicable to laboratory operation

## VI LIFSAP ENVIRONMENTAL MANAGEMENT FRAMEWORK

The main objective of the LIFSAP EMF process is to ensure that the subprojects and activities to be financed under the Project would not create significant adverse impacts on the local environment and local communities and that the residual and/or unavoidable impacts will be adequately mitigated.

The LIFSAP EMF is elaborated in response to the Bank's EA as well as the Government requirements to examine environmental issues when a project includes activities that are not yet been identified and therefore the impacts cannot be determined in a specific way.

This EMF provides the process to:

- Verify that the selected activities within the project, taking into account the environmental regulations of Vietnam and the Bank's safeguard policies.
- Establish environmental measures to reduce the negatives impacts and enhance positive impact.
- Establish a control mechanism to verify the proper implementation of the environmental measures

Environmental Management Framework of LIFSAP identifies potential environmental impacts related to livestock in general and provides a mitigation measures framework that should be applied to guide the environmental reports, environmental management plans which will be established for the specific LPZ or activity.

## **6.1 Environmental Screening, Assessment and Management Procedures applicable to Category I activities - Piloting of LPZs**

### ***6.1.1 Screening for Eligibility of LPZs to participate in LIFSAP***

A Livestock Promotion Zone (LPZ) shall not be eligible to be given support by LIFSAP if does not satisfy all of the following conditions:

- It is located at least 3 km from natural protected area, forests or wetland.
- The development of LPZ will not affect any cultural heritages, historical or archaeological sites, to any objects spiritually valuable to local communities such as temples, pagodas, churches, graveyards, sack etc.
- The land area used for the proposed LPZ is in line with local long-term land use for agricultural development planning
- The LPZ area is not subjected to significant flood risk
- It is located at least 1 km from any commune centre, public buildings, schools or clinics, or populated residential areas
- There is sufficient crop land area within LPZ or within 10 km from LPZ for the application of treated manure from LPZ, or there is/are opportunity(ies) for treated wastewater from LPZ to be discharged into agricultural land/irrigation canals/other secondary treatment facility before discharging in a river or other water bodies

Environmental screening shall be carried out by PMU environmental officer/consultant using the FORM I given in Attachment 1. Screening results shall be submitted to DLP for review and approval, and to the Bank for no-objection. At DLP, the National Project Environmental Consultant should check and verify screening result and recommend to CPMU director for approval.

If the LPZ does not meet the above-listed criteria, it shall not be financed by LIFSAP.

### **6.1.2 Environmental Assessment and Management Procedures**

For eligible LPZs, EIAs/EPCs should be prepared as soon as screening result is approved. Arrangements for EIAs/EPCs preparation will be responsible of DARD and supervised by the National Environmental Consultant.

When a decision on pilot investment on a LPZ is made, the following activities shall be supported by LIFSAP, in parallel with partial investments on infrastructure and equipment:

- Spatial planning and zoning design of livestock waste and wastewater treatment facilities
- Develop regulations applicable to LPZ to minimise negative environmental impacts
- Recruit and train staff working in LPZ
- Training for farmers on the operation of livestock waste and wastewater treatment facilities, on good manure management practices and records
- Bio-security investments

The reports should follow the standard formats for EIA/EPC regulated by MONRE but not limited to, the following information:

#### **Background Information required for existing LPZs**

- A map of the area showing the LPZ and surrounding areas. Specify the distance from the LPZ to the nearest:
  - water body, including river, pond, lake and connecting channels
  - existing/proposed roads
  - populated residential areas, protected areas
  - natural habitats, if any,
  - any known sites having historical/cultural/agricultural values
  - any sites with beautiful landscape such as water falls or mountains
- Map of current land use and Total land area of the LPZ (ha)
- Description on the existing land use in the LPZ and surrounding LPZ. Indicate which areas having crop land that can be connected to manure recycling under LIFSAP.
- Boundary of the LPZ at four directions
- Current Surface and groundwater utility in the area
- Flood/drought conditions in the area
- Baseline environmental conditions within and surrounding LPZs: air quality, surface water quality, ground water quality.
- Existing infrastructure that may be utilised or affected by the LPZ development
- Existing livestock production in the LPZ (not applicable to new LPZs), describe the locations of existing farms in the LPZ
  - The types and number of existing livestock in the LPZ ( in detail)
  - The number of farms/households using bio-digesters or other waste/wastewater treatment facilities
  - Current practice on manure handling and management
  - Opportunity for manure recycling in the area

Other relevant information collected through desk-study and field investigation

### **Description on the Investment Proposals on the LPZs**

Planning for livestock production in the LPZ (that LIFSAP will assist in planning evaluation):

- The quantity of locations of proposed farms
- The quantity of additional livestock to be raised
- Planning on livestock waste and wastewater management for the new farms, specifying what kind of facilities would be provided, and plan for supplementary manure management

### **Potential Environmental Impacts Assessment**

- Assess the potentials that increased livestock waste and waster from LPZ can cause soil and water pollution
- Assess the impacts of odour and harmful gas emission from farms/LPZs
- Assess the risks related to:
  - Operation of the waste and wastewater management facilities
  - Fly development
  - Animal Pest control
  - Safety for human related to farm/LPZ operations
- Predict and assess other impacts based on the consultant's own studies and site investigations

### **Mitigation Measures should be included in EMPs for LPZs**

Mitigation measures should be proposed to address all the environmental impacts predicted in the EIA report. The mitigation measures should be related to the following issues:

- Layout planning for LPZ
- Farm layout, including the sitting of waste and wastewater treatment facilities
- Design of waste and wastewater treatment facilities
- Livestock waste and wastewater treatment facility - Construction quality assurance
- Bio-safety related to livestock production practices
- Safety related to livestock waste and wastewater management operations
- Fly control
- Safety for human and the environment regarding pesticide handling, if the project provide supports to pest management

Details guidance on the mitigation measures to be included into the EMPs for LPZs are included in Annex B.2 -Attachment 1 of this document.

### **Environmental Monitoring Program**

- Surface water quality monitoring:

- Locations: at the discharge point of bio-digester and lagoon to ponds, the outlet of LPZ drains
  - Parameters: COD, BOD, total P, total N, nitrate, total solids and Fecal Coliforms. Note: sampling should be carried out in dry weather
  - Frequency: twice before construction, should be one in dry season and one in rainy season, then quarterly in the first year of operation, six monthly from the second year.
  - Responsibility: LIFSAP may support DARD/DONRE with some basic monitoring equipment, or PPMU will sign contract with a capable environmental monitoring firm.
- Ground water quality monitoring:
- Locations: at the wells inside and nearby LPZs
  - Parameters: total P, total N, nitrate, total solids and Fecal Coliforms.
  - Frequency: at the commencement of LPZ operations and then six monthly.
  - Responsibility: LIFSAP may support DARD/DONRE with some basic monitoring equipment, or PPMU will sign contract with a capable environmental monitoring firm.

The Environmental Monitoring Program should estimate the cost for environmental monitoring for each LPZ.

Compliance to general environmental obligations and safety rules: DARD and independent environmental monitoring consultant should monitor and assess the compliance based on the followings:

- Training courses on safety requirements and awareness raising campaigns conducted
- Conditions of waste and wastewater treatment facilities
- Usage of protective equipment by farmers
- Placement of safety warnings signs
- Complaints from surround communities/entities
- Observe environmental conditions such as odour, fly, disposal of pesticide containers etc.
- Responsibility: An independent environmental monitoring consultant will be contracted to carry out six monthly monitoring, at least one should be carried out before the Midterm review.

### ***6.1.3 Description of Environmental Management Procedures for Category I activities - LPZs***

Step 1: Environmental management procedures applied to LPZs are illustrated in Figure 2.

Step 2: PPMU will be responsible for arranging for the preparation of EIA/EPC and EMPs for the LPZs:

- LPZ category Ia – an EIA and an EMP are required
- LPZ category Ib – an EPC and an EMP are required

Compliance to the requirements on public consultations and information disclosure of EIA/EPC and EMPs as specified in Section 9.5 will also be required.

Step 3: Review and approval of EIAs/EPCs and EMPs:

LPZ category Ia – The EIA and the EMP are subjected to provincial DONRE approval and the Bank's no objections.

LPZ category Ib – The EPC and the EMP are subjected to approval from District People's Committee (DPC). The EPC and EMPs of LPZs category Ib of each city/province in LIFSAP will be subjected to the Bank's no objections.

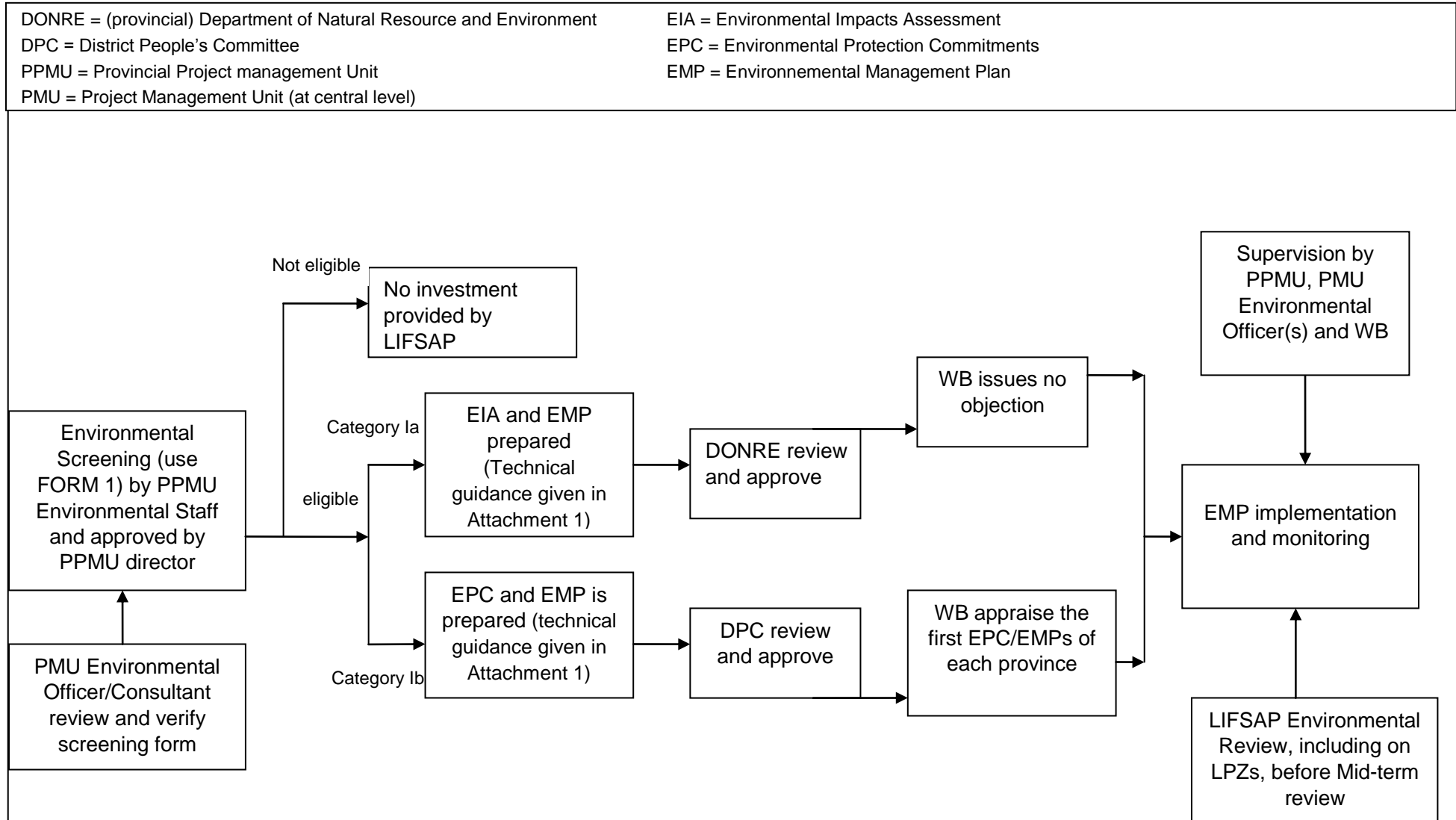
Step 4: Monitoring the implementation of EMPs

Monitoring the implementation of EMPs will be carried out by PMU, PPMU Environmental Officers, Independent Environmental Consultant and the World Bank's Task Team. DONRE may carry out random check or at request/invitation.

Environmental Review of the project

Environmental Review on the project's compliance to environmental safeguards shall be conducted by an independent consultant before Mid Term Review.

**Figure 2 Environmental Management Procedures applied to LPZs**







## **6.2 Environmental Screening, Assessment and Management Procedures applicable to Category II Activities- Livestock Infrastructure Support**

### **6.2.1 Screening for Eligibility of Slaughter Houses**

Only slaughter houses satisfying all of the following conditions would be financed by LIFSAP:

- The site is in line with local authority's long-term land use planning
- The site is at least 3 km from any environmental sensitive areas such as natural forest, wetland, protected areas etc.
- The construction/upgrading of slaughterhouse will not affect any cultural heritages such as temples, pagodas, churches, known graveyard.
- The site is at least 1 km from a residential area.
- The site should not be threatened by urban expansion within the next 10 year.
- The slaughter house is accessible to clean water and sufficient power supply
- The slaughterhouse has sufficient space for the construction and maintenance of an effective waste water treatment and waste management.

### **6.2.2 Environmental Screening: Slaughterhouses:**

According to GOV's Decree No. 29/2011/ND-CP dated April 18, 2011, the construction projects of slaughterhouses that require to prepare Environmental Impact Assessment (EIA) are: The project with a daily capacity of 500 cattle or 5000 poultry or more. (Appendix 2, Food processing projects) .

### **6.2.3 Environmental Screening: Wet (Meat) Market**

According to Decree No. 29/2011/NĐ-CP dated 18/04/2011 and Decision No. 13/2006/QĐ-BXD dated 19/04/2006 on issuing TCXDVN 361 : 2006 about Standard Market Design, a market with over 200 sellers require an Environmental Impact Assessment (EIA).

### **6.2.4 Environmental Screening: Farm size**

The following farm size (applied to LPZ of LIFSAP), will require an Environmental Impact Assessment (EIA):

Construction projects of centralized farms with the size from 500 buffalo/ cow heads or 1000 cattle

Construction projects of poultry farms with the size from 20,000 poultry heads, 200 ostriches or 100,000 quails.

### **6.2.5 Environmental Assessment and Management procedures**

After the screening result is approved, the EIA report/ Environmental Protection Commitment need to be made according to the administration arrangement of the provincial DARD. Environmental consultant will control and give technical support to ensure the report quality.

The EIA report/ Environmental Protection Commitment shall be submitted to appropriate agencies of environmental management in Vietnam for consideration and approval and to WB for no-objection.

**1.1.1.1 6.2.6 Environmental Documents Required**

The Checklist and the EMP shall form parts of the EPC submitted to DPC for approval. The Environmental Management Plan shall be included into the Bidding document and contract signed with construction contractor.

Compliance to the requirements on public consultations and information disclosure of EIA/EPC and EMPs as specified will also be required.

Preparation and clearance of environmental documents for small infrastructure financed by LIFSAP will follow the procedures summarised in the Table 5 below.

**Table 5 Procedures to Environmental Document Clearance**

<b>Category II</b>	<b>Environmental Clearance Procedures</b>	<b>Responsibility</b>
1	Screening on eligibility of slaughterhouse, if applicable	PPMU
2	Preparation of Environmental checklists, Environment Management Plan (EMP) for inclusion in the EPC	PPMU / contracted consultants
3	Public consultation on content of EMP	Consultant; Local authority and DARD facilitates
4	EPC submitted to DPC for approval. PMU Environmental Officer will carry out post review.	PPMU
5	Disclosure of subproject EPC and EMP at project sites.	PPMU
6	DLP inform WB in writing that environmental clearance completed. WB will choose random EMPs for post review	LPD WB
7	EMP is included into bidding documents, and in contracts signed with the contractor.	PPMU
	An Independent Environmental Monitoring Consultant (IEMC) shall be hired to monitor the implementation of all of the above procedures, and the implementation of the mitigation measures, institutional arrangements as well as other environmental commitments for the implementation of the EMP. IEMC will submit to WB	IEMC

### **1.1.1.2 6.2.7 Environmental Monitoring**

PPMU Environmental Officer and construction supervisor shall be responsible for environmental compliance monitoring at small-scale infrastructures, wet (meat) market and slaughterhouses. Random inspection may also be carried out by the Bank supervision missions.

## **6.3 Environmental Management Procedures for Category III Activities – Non structural works in the AF to LIFSAP**

Non-structural works financed by LIFSAP should be complied with MARD's decision No. 41/ 2008/QĐ-BNN dated 5 March 2008. This decision provided the lists of allowable and restricted/banned animal formulated products in Vietnam. MARD also have issued a list of allowable vaccine, biological products microbiological products and chemicals used for animal health care at decision No. 42/2008/QĐ-BNN dated 5 March 2008.

The following mitigation measures shall be applied as part of the AF investments. PPMU /DLP Environmental Officers and consultant shall be responsible for monitoring the implementation.

- Provide protective equipment and monitor the use of this protective equipment.
- Training to the veterinarians on infection prevention, safe sampling, packaging, labelling, storing and transporting specimen in compliance with national and international regulations on transportation of transmissible substance, and safe waste disposal in accordance with the State Law on Animal Health.
- Waste generated must be stored separately from other kind of wastes, packed and disposed off in accordance with Government's Decision No. 59/2007/NĐ-CP regarding solid waste management. Where possible, contract with service provider (URENCO) to collect the waste.

## **6.4 Environmental Management Capacity Building**

### **6.4.1 Department of Livestock Production (DLP)**

Environmental Management Capacity Building to be implemented under LIFSAP at central level will include:

- Provide office equipment
- Study tour on livestock waste management and environmental management in a country in Asia
- Develop database on livestock waste management practice in Vietnam, including survey, sampling and analysis, report preparation and a workshop to discuss on the findings and recommendations
- Develop guidelines on good livestock waste management practices and manure recycling
- Trainings for farmers on good livestock waste management practices

The above-listed activities will be implemented under the supervision and guidance from an international consultant and national consultant.

#### **6.4.2 At provincial level**

In project provinces, the following activities will be implemented:

- Environmental capacity building for officers from DARD and DONRE through
  - Training courses on the environmental impacts of livestock wastes and manure management
  - Recruit consultants to supervise environmental monitoring regarding livestock waste management
- Trainings for farmers to raise awareness and build capacity on environmental management
- Pollution monitoring: sampling, analysis and reporting

### **6.5 Public Consultation and Information Disclosure Procedures and Requirements**

#### Project Preparation Phase

Intensive consultations to provincial authorities such as DARD, DONRE, agribusinesses, farmer association, farmer representatives', Woman Association, Farmer Association part of the project formation and design process.

Vietnamese version of the EMF was consulted and disclosed during the preparation of the AF with stakeholders at provincial levels during October 2014. The English version of the EMF shall also be disclosed at VDIC, 63 Ly Thai To, Hanoi, and in Infoshop in Washington prior to project appraisal.

#### Project Implementation Phase

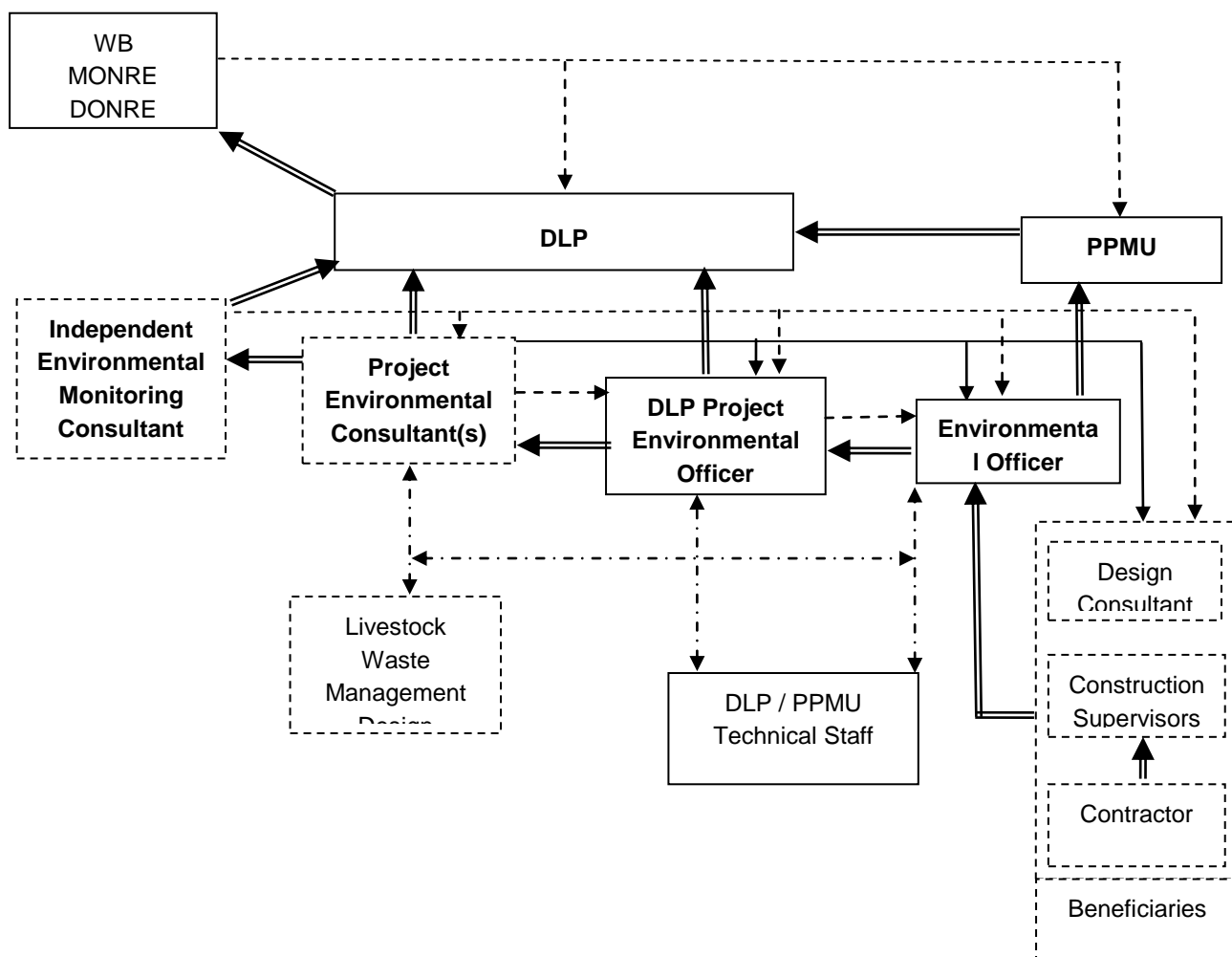
Public consultation on the draft EIA/Environmental Management Plans shall be conducted at commune level. Meeting minutes of the public consultation shall be attached to the EIA/EMP, comments received through consultation should be incorporated in the EMP.

The final EIA/EMP shall be disclosed at public accessible place in project commune. The EIA and EMP of LPZs shall be disclosed at the Bank.

### **6.6 Institutional Arrangements for implementation of EMF**

The Organisational Chart below describes the institutional arrangements for the implementation of the Project Environmental Management Framework.

**Figure 3 Institutional arrangements for the implementation of the Project EMF**



- > Environmental Monitoring / supervision
- Advisory/training on environmental issues
- ⇒ Environmental Reporting
- ↔ Environmental Technical Support
- Permanent
- Exist during project implementation only

The key personnel involved in the implementation of the Project EMF will be:

National Environmental Consultant(s) (NEC) Environmental Independent Monitoring Consultant	DLP Project Environmental Officer(s). PPMU Environmental Officer DLP and PPMU Technical Staff
	Technical Design Consultant Construction Supervisors Contractor Beneficiaries

### **6.6.1 MARD/DLP**

At Central level, MARD is the Project Owner of LIFSAP. DLP shall coordinate the project activities; recruit the international and national environmental / livestock waste management consultants who will work at both central and provincial levels.

DLP will also assign one Environmental Officer in charge of supervising the compliance to project's environmental management framework. Staff from Livestock Environmental Management Division under DLP will be trained to take part in the implementation of environmental activities

#### **DLP Environmental Officer**

DLP shall appoint (an) Environmental Officer(s) to receive training from the National Environmental Consultant and other Training providers on the Project EMF requirements and other project environmental related issues. He/she shall monitor and implement Project EMF under the supervision of the National Environmental Consultant. DLP Environmental Officer shall be supported by technical staff and consultants.

### **6.6.2 DARD / PPMU**

At provincial level, DARD is the key stakeholder of the Project. DARD will be responsible for allocating sufficient resources for implementing the project environmental activities, safeguards procedures and mitigation measures.

DARD technical staff will actively take part in environmental training, technology transfer, environmental monitoring and management. DARD shall supervise the consultant's work to make sure that the mitigation measures are included into the sitting and design of the works, and mitigation measures are included into the bidding documents.

Each PPMU will appoint one Environmental Officer who will be responsible for preparation of environmental screening forms and check lists for LPZs and other small infrastructure investments. This staff shall be trained and supervised by the National and International Environmental Consultants.

#### **PPMU Environmental Officer**

PPMU shall appoint an Environmental Officer to receive training from the National Environmental Consultant and other Training providers on the Project EMF requirements and other project environmental related issues. His/her responsibilities shall include, but not limited to:

- Prepare all project environmental documents for subprojects under the supervision of the National Environmental Consultant and DLP Environmental Officer.
- Ensure that relevant environmental mitigation measures are incorporated adequately into the sitting, design, bidding and contractual documents of subprojects
- Monitor the implementation of environmental mitigation measures during construction and operation phases

- Maintain all environmental records and submit to the National Environmental Consultant, DLP or Independent Monitoring Consultant as required

DLP Environmental Officer shall also be supported by PPMU technical staff and consultants.

### ***6.6.3 National Environmental Consultant***

The National Environmental Consultant shall be responsible for the overall implementation of the Project Environmental Framework. He/she shall work full time in the project and his/her responsibilities will include, but not limited to, the followings:

- Review the environment related activities of the project and make the implementation plan
- Monitor the environment related to activities of the project
- Contribute to the assessment of existing livestock production land use and develop guidelines for future livestock development land use planning, rules applied in promotion zone for livestock production (each province and nation-wide).
- Design a detail program for environmental monitoring and management capacity building for DLP and PPMU. Conduct other relevant formal and informal training activities
- Design detail work program for livestock wastewater discharged standards. This issue needs to be considered and discussed between WB and MARD
- Review engineering designs of waste and wastewater treatment facilities at LPZ and slaughter houses. Review typical designs of waste and wastewater treatment facilities at household level.
- Design and participate in the implementation of pilot studies on improved manure management. Conduct environmental trainings to DARD environmental staff and beneficiaries.
- Supervise the project environmental monitoring program
- Review TOT trainings on operation and maintenance of livestock waste and wastewater treatment facilities
- Provide on-the-job training to DLP and PPMU Environmental Officers on supervising and implementation of Project EMF and environmental activities including environmental monitoring and reporting. Supervise the works carried out by the trained Environmental Officers.
- Prepare TOR for Independent Monitoring Consultant and assist DLP in recruitment process.
- Develop supplement guidelines for the types of investments not yet be addressed in the existing EMF and update the EMF. This task should be done in consultation of the PPMU Environmental Officer, provincial DONRE
- Provide guidance and technical assistance to PPMU/Consultants during the preparation of project environmental documents such as environmental screening, checklists, environmental assessment and environmental management plans
- Provide technical assistant to the International Consultants as required.
- Supervise the implementation of Environmental Management Plans. Carry out random check of EMP compliances or carry out site inspection when required



- Provide technical inputs on land use assessment for existing LPZs, development of guidelines and rules for LPZs, siting of waste and wastewater treatment facilities designs of livestock waste and waste waster treatment facilities
- Liaison with contracted service providers on environmental survey and monitoring. Supervise the quality of their works.
- Manage environmental monitoring program

#### ***6.6.4 Independent Monitoring Consultant***

The Independent Monitoring Consultant shall carry out monitoring on six monthly basis on all environmental aspects of the Project. Detail TOR for IMC shall be prepared by the National Consultant.

#### ***6.6.5 MONRE/DONRE***

MONRE /DONRE will review and comments on specific EIA/EPC and EMP prepared for the investments under LIFSAP. DONRE will also carry out environmental (water and wastewater) monitoring following the program designed by the Project. On the other hand, DONRE would also be benefited from LIFSAP through capacity building activities.

#### ***6.6.6 DAH***

DAH shall make sure that protective equipment for workers are to be provided together with vaccine as a package. Training on safety operations for veterinarians should also be included as part of LIFSAP supports.

#### ***6.6.7 Local Authorities at Commune and District Level***

Local authorities shall be responsible for facilitating community consultation, awareness raising and EMP disclosure to be conducted at their localities. Local authorities will also coordinate with DARD in implementing relevant mitigation measures

#### ***6.6.8 Design Consultants and Service Providers***

National and International Consultants and service providers (such as Environmental Assessment, livestock waste management etc.) will be contracted to provide various services during the implementation of the environmental activities during the implementation of the Project. The service providers shall be responsible for the implementation of the mitigation measures specified in their contract. Design consultants will make sure that the mitigation measures are taken into account during the sitting and design of the works, and the mitigation measures proposed to be implemented by the contractor are included into the bidding document prepared by the design consultants.

If a consultant is hired to supervise the construction of infrastructure, he will also be responsible for day-to-day monitoring of contractor's environmental compliance.

#### ***6.6.9 Construction Contractors***

Construction contractor shall be responsible for the implementation of all mitigation measures and environmental monitoring specified in their contracts.

#### ***6.6.10 Other Beneficiaries***

Beneficiaries of the Project include livestock farmers, slaughter house owners and workers, markets operators, traders, laboratory workers etc. They will participate and benefit from project training activities on awareness raising and treatment of livestock waste and wastewater treatment. They will be responsible for the proper operation and maintenance of the works provided by the project and the implementation of the mitigations measures required. On the other hand, beneficiaries of the matching grant program shall be responsible for financial contribution at 70% of the construction and equipment costs.

**ATTACHMENT 1: ELIGIBILITY, ENVIRONMENTAL SCREENING AND DATA SUPPORTING THE PREPARATION OF EIA AND EMP'S FOR LPZ**

**ANNEX A: ELIGIBILITY & ENVIRONMENTAL SCREENING FORMS FOR LPZS**

**FORM 1**

**I - Location of LPZ:**

Province:                      District:                      Commune:

**II – Screening Questions**

	<b>Screening Question</b>	<b>Y</b>	<b>N</b>	<b>Unknown</b>
1.	Is the (proposed) LPZ located within 3 km from an environmental sensitive area such as natural protected areas, national parks, forest, wet land?			
2.	Is the development of the LPZ in line with local / central land use and agricultural development planning?			
3.	Is the LPZ subject to significant annual flooding? If yes specify the duration and inundation level.			
4.	Is the LPZ within 1 km from either (a) and populated residential area; (b) community centre; and (c) public buildings such as offices, schools, clinic etc.			
5.	Is there any cultural heritage such as pagodas, temples, churches or graveyards affected by the LPZ?			
6.	Is there sufficient crop land within 10 km from the LPZ that can be used for the recycling of manure and sludge from waste water treatment systems? If not, is there opportunity for treated wastewater from LPZ discharged into agricultural land/irrigation canals before entering river or other water bodies?			

Screening result:

- At least one question answered as Y → LPZ is not eligible for LIFSAP support
- all questions answered as N → LPZ is eligible for LIFSAP investment
- all questions answered as N but at least one answered as “unknown: → further investigation is required until the question can be answered as Y or N

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

**III – Type and Size of LPZ**

Existing                       Proposed

If this is new LPZ, the number of animals to be raised:

..... pigs                      ..... cows                      ..... poultry                      ..... others (specify)

If this is existing LPZ, the number of additional animals to be raised:

..... pigs                      ..... cows                      ..... poultry                      ..... others (specify)

Conclusion: (refer to Decree No.21/2008/ND-CP)                      EIA is required (LIFSAP Env Category Ia)                       EPC is required (LIFSAP Env Category Ib)

**IV — Conclusion**

LPZ is eligible to be financed by LIFSAP, LPZ is Environmental Category Ia, EIA is required

LPZ is eligible to be financed by LIFSAP, LPZ is Environmental Category Ib, EPC is required

LPZ is not eligible to be financed by LIFSAP


Screened by

Date

Approved by

**ANNEX B.1: DATA AND INFORMATION SUPPORTING THE  
PREPARATION OF EIAs FOR LPZ'S**

**B.1 Livestock Waste and Wastewater Generation**

The data provided below can be used as reference for calculating the amount of manure, urine as well as the contents of substances in such livestock wastes.

**Table 1.1. – Manure and urine generated per head of livestock**

<b>Livestock</b>	<b>Amount of manure and urine generated (kg/day/head)</b>
Poultry	0.07 – 0.1
Pig	3.5 – 7
Cow	18 – 25
Buffalo	30 – 40

*Source: a case study from MARD's agricultural business promotion website*

**Table 1.2. Manure production and nutrient excretion by cattle (South-East Asian figures)**

<b>Livestock</b>	<b>Manure (kg/day)</b>	<b>N excretion (g/d)</b>	<b>P excretion (g/d)</b>
Beef	21.1	74.06	17.3
Dairy	53.15	186.56	43.58
Buffalo	27.67	97.13	22.69

**Table 1.3. Emission factors (% of N excreted) for NH<sub>3</sub> for various manure management systems**

<b>Management system</b>	<b>Pigs</b>	<b>Dairy</b>	<b>Poultry</b>	<b>Other cattle</b>
Anaerobic lagoon	0.4	0.35	0.4	0
Pit storage	0.25	0.28	0	0
Deep bed	0.4	0	0	0.3
Liquid slurry	0.48	0.4	0	0
Solid storage	0.45	0.3	0	0.45
Dry lot	0	0.2	0	0.3
Daily spread	0	0.07	0	0
No litter	0	0	0.55	0
With litter	0	0	0.4	0

**Table 1.4. Emission factors (% of N excreted) for N<sub>2</sub>O from management of animal excreta.**

<b>Management system</b>	<b>Pigs</b>	<b>Dairy</b>	<b>Poultry</b>	<b>Other cattle</b>
Anaerobic lagoon	0.38	0.42	0.37	0

Pit storage	0	0	0	0
Deep bed	0,1	0	0	0.1
Liquid slurry	0	0	0	0
Solid storage	0.05	0.1	0	0.05
Dry lot	0	0.1	0	0.1
Daily spread	0	0.15	0	0
No litter	0	0	0	0
With litter	0	0	0.1	0

**Table 1.5. Emission factors for CH<sub>4</sub> from enteric fermentation and manure management.**

<b>Animal species</b>	<b>Enteric fermentation (kg/year)</b>	<b>Manure management (kg/year)</b>
Dairy	61	30
Other cattle	47	1
Buffalo	55	2
Fatteners	1	7
Sows	1	7
Laying hens	0	0.02
Broilers	0	0.02
Duck	0	0.02

## ANNEX B.2 MEASURES TO PREVENT OR MITIGATE ENVIRONMENTAL IMPACTS FOR LPZS

### B.2. Livestock Waste and Wastewater Decomposition Process and Products

Odour is the result of decomposing organic matter. Aerobic manure decomposition produces few odorous gases and the main product would be CO<sub>2</sub>. Anaerobic manure decomposition results in the release of many odour and sometimes dangerous gases, including ammonia, amines, hydrogen, sulphide, mercaptans and methane. Anaerobic conditions occur when wet manure is stored in piles or when liquid manure is stored in pits for long periods.

#### Health Effects of gases emitted from livestock decomposition process

The following is a brief summary of the physiological effects of gases commonly encountered in manure pits. Because all of the gases generated in these pits can displace oxygen (O<sub>2</sub>), atmospheric conditions inside the pit can become oxygen-deficient. Table 7 lists the health effects associated with various percentages of oxygen in the atmosphere.

**Table 1-6. Health effects associated with various percentages of oxygen in the atmosphere**

% oxygen in atmosphere	Health effects
21 (normal oxygen content in air)	None
19.5 (minimum oxygen level for safe entry)	None
16	Impaired judgment and breathing
14	Faulty judgment, rapid fatigue
6	Difficult breathing, death in minutes

### B.3. Risks related to Manure Storage

The decomposition of waste that occurs in manure storage facility can create oxygen-deficient, toxic, and/or explosive atmospheres. The anaerobic bacterial action that breaks down the manure can generate methane, hydrogen sulphide, carbon dioxide, and ammonia. These gases may produce toxic effects, but more important, they can displace oxygen in a confined space. Deaths can occur from lack of oxygen or from the toxic effects of these gases. In addition, methane and hydrogen sulphide may present an explosion hazard.

**Table 1- 7. Health Effects of gases emitted from animal wastes decomposition under anaerobic conditions**

Gas	Characteristics	Health Effect
Methane	Methane (CH <sub>4</sub> ), is an odourless gas that is flammable or explosive at concentrations of 5% to 15% by volume of air.	At high concentrations, methane can displace enough oxygen to cause death by suffocation. Because this gas is lighter than air, it occurs near the top of the pit. Methane should be expected to be present in manure pits.
Hydrogen	Hydrogen sulphide (H <sub>2</sub> S) is a highly	At high concentrations, hydrogen

Sulphide	toxic gas with a “rotten egg” odor at low concentrations. Because this gas is heavier than air, it can settle near the bottom of the manure pit. Hydrogen sulphide is a severe eye irritant and may cause tissue damage. At low concentrations, gas can cause dizziness, headache, nausea, and irritation of the respiratory tract.	sulphide can cause unconsciousness, respiratory failure, and death within minutes. In addition, hydrogen sulphide may be explosive at a wide range of concentrations in air - 4.3% to 46% by volume.
Carbon Dioxide	Carbon dioxide (CO <sub>2</sub> ) is an odorless that is normally in the atmosphere. Because this gas is heavier than air, it can settle near the bottom of the manure pit.	At low concentrations, carbon dioxide can result in laboured breathing, drowsiness, and headache. At high concentrations, carbon dioxide can displace enough oxygen to cause death by suffocation.
Ammonia	Ammonia (NH <sub>3</sub> ) has the sharp odor characteristic of household ammonia. Ammonia is the most important gas health wise found in swine buildings on a day-to-day basis because it can occur at levels high enough to be an irritant to the respiratory system.	This gas can severely irritate the eyes, nose, throat, and lungs. Exposure to high concentrations can be fatal.



## ANNEX C: DATA AND INFORMATION SUPPORTING THE PREPARATION OF EMP FOR LPZ

### C.1 Selection of solutions for Livestock waste and wastewater management

- For the Livestock waste and wastewater management, it will be necessary to consider bio-digester that should be provided under LIFSAP matching grant program.
- Secondary treatmentlike lagoon and fish ponds, should also be considered and proposed.
- Recycling of nutrient should also be implemented in LPZs supported by LIFSAP. Alternatives for improved livestock wastes management and manure recycling will also be practiced under LIFSAP.
- Consultants shall be hired at both central and provincial levels to facilitate the establishment of livestock waste and water treatment facilities in LIFSAP.

The subsections below describe some of the available options.

### C.2 Bio-digester

Use 10TCN 492 to 499 2002 if bio-digester < 16 m<sup>3</sup> are proposed to be built for managing individual farm's livestock waste.

- 10TCN 492-2002 – Small-scale bio-digester. General Technical Requirements;
- 10TCN 493-2002 - Small-scale bio-digester. Requirements for Construction
- 10TCN 494-2002 - Small-scale bio-digester. Requirements for Gas distribution and Utilisation
- 10TCN 495-2002 - Small-scale bio-digester. Standard for Checking and Acceptance;
- 10TCN 496-2002 - Small-scale bio-digester. Requirements for Operations and Maintenance;
- 10TCN 497-2002 - Small-scale bio-digester. Safety Requirements;
- 10TCN 498-2002 - Small-scale bio-digester. Lists of important Parameters and Technical Specifications;
- 10TCN 499-2002 - Small-scale bio-digester. Standard Design.

For larger bio-digester, capable design consultant should be contracted to carry out field investigation, design and supervise the construction. However, the above-mentioned standards should be used as reference for determining design parameter, construction inspection, operation and maintenance rules.

The Vietnamese version of the 10TCN 492 to 499 2002 can be found on MARD website. Some key issues are summarised below:

**10TCN 493 2002 Requirements for construction.** Beside the specifications on the materials and construction techniques, this standard also include the criteria for the siting of Bio-digester:

- Must be at least 10 m from water well
- Away from big trees so as their roots does not cause damage to the digester

- At shortest possible distance to the stove
- Should be exposed to sunlight but wind tight
- Should be safe from flood

**10TCN 496 2002 Requirements for Operation and Maintenance.** This standard guide in detail the steps to be carried out from the commencement to operation and daily and periodical maintenance of bio-digesters.

**10TCN 497 2002 Requirements for Safety.** This standard lists the safety risks that may happen during the operation of the bio-digester such as facility failure, fire and explosion and human health hazard when accessing the tank and introduced detail precautionary and mitigation measures to avoid/ minimise these risks.

**10TCN 499 2002 Standard Designs.** The design of some models are introduced in this standards.

### **C.3 Manure Characteristics, Storage, Transportation and Management**

Providing a manure storage facility would help to reduce the size required for a bio-digester. However, to avoid pollution, a well-planned manure storage system is required. Below is the technical advice adapted from a publication issued in October 2003<sup>16</sup>.

#### **C.3.1 Manure Characteristics**

Depending on the housing situation, manure may be handled and stored as a liquid, solid or semi-solid. Manure is classified using the following criteria:

- Liquid – contains less than 10 percent solids. As excreted, manure typically has a solid content of 12 to 13 percent. Additional water comes from washing, spilled water and other waste.
- Semi-solid – contains 10 to 20 percent solids.
- Solid – solid content greater than 20 percent.

To produce a solid, the liquid is drained and the manure is dried or has bedding added.

Manure storages are either anaerobic or aerobic depending on oxygen availability. Anaerobic action occurs in the absence of oxygen; aerobic action occurs in the presence of oxygen. Mechanical mixing or aeration creates aerobic conditions. Anaerobic storages are generally less costly than aerobic storage but are more odorous. Although aerobic storage is less odorous, more ammonia is released from the storage, which reduces the fertilizer value of the manure and can contribute to acid rain.

#### **C.3.2 Sitting of Manure Storage**

- Be located at least 100 metres from a spring or water well and at least 30 metres from common bodies of water, such as streams, creeks and ditches.
- Be located at least one metre above the 1:25 year flood level.

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<sup>16</sup> The name of the publication: "Beneficial Management Practice – Environmental Manual for Dairy Producers in Alberta", at <http://www1.agric.gov.ab.ca>

- Have at least 0.5 metres vertical distance between the full level of the structure and the upper edge (freeboard).
- Be accessible in any weather condition
- Be adequately secured to prevent accidental entry of humans, animals and machinery.

### **C.3.3 Types of Manure Storage**

Liquid storage can be an earthen manure storage, lined with compacted clay or plastic material. If the storage poses a risk to groundwater, a concrete or steel storage tank may be required. When concrete or alternative storage facilities are used, a professional engineer should verify the design and construction of the facility and the manufacturer should be consulted about ongoing maintenance.

#### ***Semi-solid storage***

Dairy manure will be semi-solid in facilities that use minimal amounts of bedding, for example. These structures should:

- Meet the criteria listed in Section C.2.1.2 for manure storage structures.
- Have reinforced concrete walls, or equivalent, to adequately contain the manure.
- Have a concrete floor, which is sealed to the walls to provide a manure-tight storage and eliminate the entrance of ground or surface water.
- In areas with a high water table, be constructed entirely above ground to minimize seepage of groundwater into the structure (this will also facilitate cleaning out).
- If roofed, be well ventilated to prevent the accumulation of hazardous gases in the headspace area and to aid the drying of the stored manure.
- If fitted with a ramp, have guardrails and safety stops on the ramp to prevent a tractor from being buried in the manure.
- Have a suitable concrete slab area for tractor and manure spreader activity. This slab should be sloped away from the building so that water on the slab does not enter the storage area.

#### ***Solid storage***

Solid storage can be classified as: short-term, long-term and in-barn storage. Short-term storage contains manure for no more than six months over a three-year period. Long-term storage is greater than six months.

- Prevent surface water runoff from the storage from entering an open body of water or leaving the property.
- Do not construct manure storages on the banks of rivers, drainage channels or depressions that may carry surface runoff to water sources.
- Use beams, catch basins or surface plants as buffers to reduce water pollution risks
- Ensure the storage bottom is at least one metre above the water table.
- Storages for solid and semi-solid manure must be constructed 4% above the yearly flood plain. If it is difficult to identify this yearly flood plain, the storages should be sat above the highest known flood level.
- Provide drainage for the storage so that the water is not stored there. The slope of the bedding should be about 2% to provide the necessary drainage.

### C.3.4 Determining Manure Storage Capacity

Manure storage facilities should provide enough storage space to allow the operator to spread manure when optimum crop uptake of the nutrients will occur, and when manure runoff from fields to surface water is unlikely.

Manure storage facilities should be built with a storage capacity of 12 to 14 months to minimize spreading costs.

Below are the figures from the publication that can be used for calculating the volume of manure storage required:

Daily solid manure production	Kg	Volume (m3)
Tie stall	63.5	0.2394
Loose housing	66.5	0.2509
Replacement	19.5	0.0738
Calves	1.3	0.0063

Calculations based on the figures above show that 1 m<sup>3</sup> of manure storage can accommodate from 210 to 265 kg of manure, or for storing 1 T of manure a from 3.8 to 4.8 m<sup>3</sup> of storage is needed. In determining the capacity of manure storage, coefficients need to be used taking into account the following factors:

- If bedding is used in solid systems, the weight of manure may increase by 20 percent and the volume may double.
- Where precipitation can enter the storage, the storage must have sufficient capacity to prevent liquid inside from overflowing when being cleaned.
- Include reserve capacity in the storage to allow for the accumulation of solids.
- Prepare proper space for manure to be stored
- Consider carefully field conditions, labour availability, and weather conditions

### C.3.5 Safety Rules when working with Manure Storage facilities

Many farm workers appear to be unaware of the immediate danger posed by entry into manure pits. Like other types of confined spaces, manure pits present special problems regarding worker awareness of hazards. The dangerous atmospheric conditions may exist intermittently.

Manure pits on farms should be treated like any other type of confined space. As such,

- all manure pits should be ventilated,
- a standby person should be in constant contact and ready to lift the worker to safety with mechanical lifting equipment (winch, hoist, or pulley), and
- anyone entering a manure pit should wear a safety belt or harness with a lifeline tied to the mechanical lifting device.
- NEVER enter a manure pit unless absolutely necessary and only when proper safeguards have been taken!
- Post hazard signs on all manure pits. The signs should be understandable to illiterates

- Explosion-proof ventilation equipment must be used because methane and hydrogen sulphide gas can be explosive. The pit should be ventilated continuously.
- NEVER enter a manure pit unless someone is standing by and maintaining constant visual or auditory contact. This standby person must
  - remain at the opening of the pit during the entire time the pit is occupied,
  - have a mechanical device (winch, hoist, or pulley) in place to help remove the person from the pit,
  - be physically capable of using the mechanical device to lift an unconscious victim from the pit without entering it,
  - resolve all details of the rescue plan, including availability of rescue equipment, before anyone enters the pit, and
  - remember that a delay of even a few minutes could be fatal in an emergency.
- ALWAYS wear a harness or safety belt with a lifeline when entering a manure pit. Secure the end of this lifeline to the mechanical lifting equipment outside the pit. The use of a harness or safety belt with a lifeline is critical because it is the only safe means for a standby person to rescue a worker from the pit without proper respiratory protection (i.e., positive-pressure, self-contained breathing apparatus).
- NEVER enter a manure pit to attempt a rescue without proper respiratory protection (i.e., positive-pressure, self-contained breathing apparatus). Rescuers who enter the pit without such equipment will almost certainly become victims. Instead, call the local fire department or rescue squad immediately. They have the training and equipment needed to accomplish such a rescue without endangering other lives.

### C.3.6 Manure Transportation

Moving manure from storage to the field is an important component of the manure management system. The nuisance risks associated with manure transportation include dust, spillage and physical impact on roads.

Traffic during dry, windy periods can result in significant dust generation. In “sensitive areas,” such as near neighbours, dust suppression or detouring may be necessary.

Manure is considered a biodegradable product. However, direct spillage from manure trucks needs to be kept to a minimum. Whether manure is wet or dry, spillage may come in the form of seepage, overloading or blowing. Whatever the case, appropriate management techniques and equipment are required to keep the roads and ditches free of manure spillage. This may mean smaller loads, covered loads or sealed end-gates on the manure truck. In the event of excessive spillage, clean-up measures, such as sweeping, will be required.

### C.3.7 Maintenance of Earthen Manure Storages

**Signage and fencing.** Hazardous areas such as storage structures, dugouts and water basins should be fenced and have warnings posted to prevent curious humans and animals from accidents.

**Mowing.** Keep weeds and grass mowed to promote a positive image, reduce the potential for liner damage and reduce flies and rodents.

**Odour.** Decomposition of manure in storage structures can create odours that may be strong and offensive. When manure is undisturbed, gases are trapped beneath the surface within

clusters of solid material. With time, the trapped gases increase in volume and rise to the surface in a bubble. At the surface, the bubble bursts and odorous gases are released into the atmosphere. This is a natural process that occurs slowly over time. It is important to note that strong and offensive odours are generated intermittently from manure storages. Weather conditions and practices related to loading and emptying can affect the odour release.

**Weather conditions.** Temperature influences the generation of odorous gases. During warm summer conditions, the temperature rises in stored manure, increasing microbial activity, resulting in faster decomposition of waste matter and an increase in the volume of odorous gases released. Under cold winter conditions, bacterial activity in storages will stop. Odour levels increase when bacterial activity stops or starts. Wind and rain may influence the odours released from manure storages because they agitate the contents of the storage. A crust on the surface of outdoor manure storage helps contain odorous gases. However, if strong winds or heavy rain agitate the storage or disturb the crust that forms on the surface of some manure storages, the release of odorous gases may increase.

**Loading and emptying.** Manure is disturbed when storages are loaded or emptied. To reduce odour when adding new manure to a pre-existing volume in a manure storage, it is advisable to discharge the new material beneath the surface of the manure. The discharge point should be at least 1 metre from the surface of the manure and 0.5 metres above the bed of solids at the bottom. This limits the disturbance of gases trapped in the manure. In addition, use a low discharge flow rate to prevent vigorous agitation of the manure.

### **C.3.8 Visual Monitoring Earthen Manure Storage Performance**

There are several visual indicators of storage problems. These include:

- Content levels that do not change.
- Wave damage to the liner.
- Erosion where manure enters or is pumped from the storage.
- Cracking or slumping of the liner.
- Seepage, soft spots or slumping on the outside of the beam, or several feet out from the beam, which indicates leakage. Any leakage or slumping is a serious problem that requires immediate attention.
- Evidence of rodents. Rodent burrows damage the liner and walls of the manure storage.
- Tree roots. To prevent roots from penetrating the liner and creating leaks, remove trees and plants that start to grow in the manure storage. Trees, if planted, should be located with their mature root zone well beyond the storage.

## **C.4 Control Odour and Gas Emission in Livestock Production**

Much of the odour in barns is from feces and urine on floor surfaces. To control the odour and the gases, the following measures should be applied:

- Improve ventilation as higher ventilation rates increase the rate of drying on surfaces, which reduces odour concentration.
- Remove manure from the animal housing area to a separate storage location to reduce the release of odorous gases back into the barn.
- Remove animal feces, urine, waste feed and wet manure continuously throughout the day.
- Handle manure in as a dry state as possible.

- Remove and promptly dispose of dead animals and afterbirths.
- Check the direction of the prevailing wind before agitating or spreading manure to minimize the release and spread of odours and manure particles that would affect neighbouring residences or public places.
- Use covers to reduce odour and gas emissions from manure storages. Materials can be used to make cover can be straw, foam, glass or clay particles, floating plastic sheets, plastic covers with a frame and geotextile covers held in place by negative air pressure. While these covers provide excellent odour control results, cost, anchoring and pump-out issues still need to be resolved.

### *Specific Solutions to control Ammonia Emission*

<b>Mitigation Measure</b>	<b>Description</b>
Maintain good Hygiene in animal cage area	Good hygiene in animal keeping area reduces ammonia emissions by reducing the amount of manure-covered surface area. This includes the pig's skin. The warm body of an animal, when covered with wet manure, makes an area of accelerated bacterial growth and ammonia production which is quickly vaporized into the air by body heat. Animals should be kept clean and dry.
Avoid storing manure in the cage for long periods. This is more effective with poultry than with swine	The rate of ammonia released from manure increases for storage times longer than about one day. However, there are no further reductions in ammonia release rates for less than one day because so much comes from dirty surfaces (slats, floor, animals, etc.). Ammonia production peaks at three days and again at 21 days. Frequent manure removal helps maintain low ammonia gas levels. Removing manure frequently to reduce ammonia is more effective with poultry than with swine because ammonia formation takes place mainly from the swine's urine. This occurs so rapidly that cleaning intervals in swine cages would have to be at least half-hourly and the urine, in particular, would have to be removed as completely as possible. This can be done efficiently only with flushing systems since surface scrapers always leave behind a film of urine on the surface, from which emission takes place.
Use straw bedding to reduce ammonia gas inside the animal keeping building	Well-managed and sufficient amounts of straw bedding will reduce ammonia gas inside the building more than any other solid manure management system. However, the overall emissions to the outside atmosphere are the same due to higher losses during storage and spreading. More dust is found in the building with straw, and fungal spores will dominate airborne microorganisms.

### **C.5 Fly Control**

The following measures would be implemented for fly control:

- Keep pig cages free of manure as soon as possible
- Cover drain within and around the area
- Drain to eliminate stagnant water from drains
- Practice manure management
- Use of pesticide if necessary

If necessary, use the spray designated for fly control. Below are two kinds of spray listed in the list of allowable animal health control products issued at MARD's decision *no. 41/2008/QĐ - BNN on 5 March 2008*. Follow the instructions given in the labels and the safety rules set out for handling pesticides provided in section C.6 below.

**Table 9 – Recommended pesticide for fly control**

	<b>Name of pesticide</b>	<b>Major content</b>	<b>Packaging</b>	<b>Capacity</b>	<b>Treatment</b>	<b>Registration Number</b>
1	Viatox-Spray	Deltamethrine	Bottle	50; 100; 200; 250; 500ml; 1; 5 l	Treat parasite diseases caused by flies and other vermin	VA-44
2	Etox-Pharm	Deltamethrin	bottle	10; 20; 50; 100; 250; 500ml; 1l	Prevent and treat skin disease caused by fly and other vermin for cows, pigs, goats, lambs and buffalo.	Phar-69

A single pesticidal product rarely gives the most effective and economical control. It is normally best to use a combination of pesticide applications such as residual wall sprays, space or aerosol sprays, baits, etc. during the fly season. Because fly resistance is always a possibility, it is best to rotate different chemical class insecticides, especially when one group begins to lose its effectiveness. One may alternate synthetic pyrethroids such as permethrin or fenvalerate to organophosphates such as tetrachlorvinphos, dimethoate or fenthion to insect growth regulators. Do not wait for heavy fly populations. It is much easier and less expensive to prevent heavy fly build up than to control heavy fly populations after build up. As fly populations begin to build up, take time and treat regularly<sup>17</sup>.

### **C.6 In-farm Biosafety**

Farmers shall be trained to adopt the safety rules when dealing with livestock wastes.

<sup>17</sup> Ohio University Extension Bulletin, 1995



**ATTACHMENT 2: ELIGIBILITY, ENVIRONMENTAL IMPACTS SCREENING  
AND GUIDELINES OF MITIGATION MEASURES - CATEGORY II  
ACTIVITIES**

**ANNEX A: ELIGIBILITY AND ENVIRONMENTAL IMPACTS SCREENING  
FORMS**

**FORM II-1 – ELIGIBILITY AND ENVIRONMENTAL IMPACTS SCREENING  
FOR ACCESS ROAD**

**I Location**

Province                      District                      Commune

**II Scope of Work**

Start point                      End point  
Length                      Width

**III Eligibility Screening**

	<b>Screening question</b>	<b>Y</b>	<b>N</b>	<b>Action</b>
<b>1</b>	Is the proposed access road or borrow pits located within 1 km from any protected or environmental sensitive areas such as natural reserve, Park, protected areas, wet land?			Reroute or reselect the site to have the answer as “N” if possible otherwise exclude the proposal from LIFSAP financing
<b>2</b>	Will the construction of the access road affect any cultural heritage such as temples, church, graveyards, etc?			Reroute or reselect the site to have the answer as “N” if possible otherwise exclude the proposal from LIFSAP financing

If both answers above have “N” answer, continue with the checklist below

**IV Environmental Impacts Screening**

	<b>Impact</b>	<b>Y</b>	<b>N</b>	<b>Description</b>
	Will the construction or upgrade of the access road...			If “yes” then specify which activity(ies) cause the impacts, who are affected, scope, and duration. Provide figures about size, quantity and other relevant parameters where possible). Below are some suggestions:
<b>1</b>	Requires land acquisition?			Describe the extend of : <ul style="list-style-type: none"> <li>○ The land area to be acquired</li> <li>○ The number of people/households to be affected</li> <li>○ Existing land use conditions</li> </ul>
<b>2</b>	Lead to vegetation			Describe the areas and land area that vegetation may

	cover clearance			<p>take place, notice on:</p> <ul style="list-style-type: none"> <li>○ land area to be cleared</li> <li>○ density of existing vegetation cover, which associated with the amount of waste to be generated</li> <li>○ physical characteristics of the soil</li> </ul>
3	Cause disruption of existing infrastructure or service such as water or power supply, or disrupt natural waterway?			<p>Specify the infrastructure or services potentially affected, noticing</p> <ul style="list-style-type: none"> <li>○ the duration of disruption</li> <li>○ The quantity of infrastructure to be affected (length of wires/pipes, number of poles to be relocated)</li> <li>○ Technical complexity for reconnection</li> </ul>
4	Lead to reduced localised air quality due to dust and smoke from vehicles and machines during their operation in the construction?			<p>Identify the sources of emission, such as:</p> <ul style="list-style-type: none"> <li>○ exhaust of vehicles and construction plants</li> <li>○ increased traffic in the areas surrounding construction site</li> <li>○ Increased dusts level along the road used for transportation of as granular construction materials drop</li> <li>○ Dusts from temporary loading of granular construction materials such</li> <li>○ Dusts from construction waste dumping sites</li> </ul> <p>Assess the level of impacts on local people and their daily activities, noticing:</p> <ul style="list-style-type: none"> <li>- The number and frequency of vehicles in use</li> <li>- The quantity of granular materials to be temporarily loaded at a time</li> <li>- The size of the granular materials</li> <li>- Weather conditions</li> <li>- Toxicity of the materials</li> <li>- The duration that granular materials is exposed freely to the air</li> <li>- The number of people /objects affected</li> </ul>
5	Cause Increased localized noise level and vibration			<p>Identify the sources of Noise and vibration, for example</p> <ul style="list-style-type: none"> <li>○ Noise from engines of running vehicles, construction plants</li> <li>○ Noise from construction activities such as piling, excavation or installation of equipment, loading of construction materials, concrete pouring, drilling</li> </ul> <p>Assess the impacts of noise and vibration on local community, take in to account:</p> <p>The scope of impacts depends on:</p> <ul style="list-style-type: none"> <li>- The number, frequency and working durations of noise sources</li> <li>- Time of the day (night time)</li> <li>- Noise sensitivity of receptor (e.g. farmer's</li> </ul>

				meeting)
6	Degradation of surface water quality at sources nearby construction sites due to runoff from excavation/levelling or workers' camp?			State whether there are surface water sources adjacent to construction site. Estimate the possibility that runoff from construction site can enter the water source based on local topographical characteristic, construction during rainy/dry season
7	Generate Solid waste			Specify the sources, such as: - Excavation sites - construction camps/sites - ... assess the volume and duration that solid waste generation takes place
8	Cause soil erosion /subsident / contamination risks			Identify the causes, e.g. - clearance of sites from vegetation, as well as the execution of excavation works using heavy equipment. - accidental or structural spillage of fuels, lubricant chemicals, sanitary wastewater, etc., as well as from leakage from inadequately protected solid waste storage facilities and sites. - Soil erosion may also occur at borrow pits. Pay attention to the slop of the site rain condition during construction
9	Cause disturbance to traffic and daily activities			Road upgrading, excavation for drains, pipes installation and electrical wires may disturb traffic Access and business may be disturbed when the works are carried out at wet market Transportation of heavy/bulky equipment may cause obstructions to local traffic and increase safety risks on roads.
10	Affect safety and health of the public			Identify the activities or locations that have the highest safety/health risks. For example Constructions sites, excavations works, transportation, movement of heavy equipment and obstructions of roads
11	Cause risk to occupational health and safety of workers			Identify the activities that have the highest safety/health risks. For example excavations; working with heavy equipment; working in confined spaces; working on and along traffic roads; heavy lifting; storage, handling and use of dangerous substances and wastes; working under noisy conditions.
12	Involve chance findings			Assess the possibility that during works being carried out at the sites or borrow pits, objects having archaeological / cultural or religious values or explosive materials may be discovered
13	Lead to social Disturbance			Assess the extent/tendency that concentration of workers from other areas would cause social

				disturbance to the stability of local's social settings and increased the risks of social evils such as gambling or prostitutions.
14	Cause fragmentation of landscape at the borrow pits?			Describe the existing land use, landscape and topographical conditions of the borrow pits
15	Cause air pollution and increased level of noise during operation phase			Relate the assessment to: <ul style="list-style-type: none"> <li>- the density and frequency of road use by vehicles</li> <li>- population distribution in relation to the proposed route</li> </ul>
16	Affect the safety and health of the public during operation phase?			Anticipate: <ul style="list-style-type: none"> <li>- the density and frequency of road use by vehicles</li> <li>- population distribution in relation to the proposed route</li> </ul>

## FORM II-2 – ELIGIBILITY AND ENVIRONMENTAL IMPACTS SCREENING FOR POWER SUPPLY

### I Location

Province                      District                      Commune

### II Summary Scope of Work

- Installation of new transformer      Y/N                      Quantity                      Capacity  
Locations of transformers

- Install Poles                                      Quantity                      Locations:  
- New Wiring:                      Length                      Starting point                      End point  
- Estimated construction time ..... months

### III Environmental Screening

	Screening question	Y	N	Action
1	Is there any section of the proposed power supply located within 1 km from any protected or environmental sensitive areas such as natural reserve? Park, protected areas, wet land?			Reroute or reselect the site to have the answer as “N” if possible otherwise exclude the proposal from LIFSAP financing
2	Will the construction of any sections of the proposed power supply affect any cultural heritage such as temples, church, graveyards, etc?			Reroute or reselect the site to have the answer as “N” if possible otherwise exclude the proposal from LIFSAP financing

If both answers above have “N” answer, continue with the checklist below

### IV Environmental Check list for Power Supply

	Potential Impacts	Y	N	Description
	Will the construction or upgrade of the power supply ...			<i>If “yes” then specify which activity(ies) cause the impacts, who are affected, scope, and duration. Provide figures about size, quantity and other relevant parameters where possible). Below are some suggestions:</i>
1	Cause removal of vegetation cover or cut down of trees along at the sub-station and along ROW?			Provide information on the area, width and length of cleared area, density of vegetation on the ground, Type of trees/vegetation to be removed
2	cause disruption of existing infrastructure or service such as existing power supply,			Specify the infrastructure or services potentially affected, noticing the duration of disruption and the quantity of infrastructure to be affected

	roads, water supply etc.			
3	Environmental pollution caused by the increase of dust and smoke of machines/equipments during the construction and the transportation during operation			Specify the sources of emission Assess the level of impacts on local people and their daily activities, noticing:
4	Increased localized noise level and vibration			Identify the sources of noise and vibration, for example <ul style="list-style-type: none"> <li>o engines of running vehicles, construction plants</li> <li>o piling, excavation or installation of equipment, loading of construction materials, concrete pouring, drilling</li> </ul> Assess the impacts of noise and vibration on local community, take in to account:
5	Degradation of surface water quality at sources nearby construction sites due to runoff from excavation/levelling or workers' camp?			<i>State whether there are surface water sources adjacent to construction site. Estimate the possibility that runoff from construction site can enter the water source based on local topographical characteristic, construction during rainy/dry season....</i>
6	Solid waste generation			Specify the sources, such as: <ul style="list-style-type: none"> <li>- Excavation sites</li> <li>- construction camps/sites</li> <li>- ...</li> </ul> assess the quantity and duration that solid waste generation takes place
7	Soil erosion or increase water turbidity due to earth work?			Identify the causes, e.g. <ul style="list-style-type: none"> <li>- clearance of sites from vegetation,</li> <li>- execution of excavation works using heavy equipment.</li> <li>- accidental or structural spillage of wastewater, etc., as well as from leakage from inadequately protected solid waste storage facilities and sites.</li> <li>- Soil erosion may also occur at borrow pits. Pay attention to the slop of the site rain condition during construction</li> </ul>
8	Disturbance to traffic and daily activities			Road upgrading, excavation for drains, pipes installation and electrical wires may disturb traffic Access and business may be disturbed when the works are carried out at wet market Transportation of heavy/bulky equipment may cause obstructions to local traffic and increase safety risks on roads.

9	Safety and health of the public			Identify the activities or locations that have the highest safety/health risks. For example Constructions sites, excavations works, transportation, movement of heavy equipment and obstructions of roads
10	Occupational health and safety of workers			Identify and describe the activities containing high accidental risks such as unfilled pole foundation, working on top of poles, poles installation, trucks unloading materials and equipments, , commissioning etc
11	Chance findings			Assess the possibility that during works being carried out at the sites or borrow pits, objects having archaeological / cultural or religious values or explosive materials may be discovered
12	Social Disturbance			Assess the extend/tendency that concentration of workers from other areas would cause social disturbance to the stability of local's social settings and increased the risks of social evils such as gambling or prostitutions.
13	Cause air pollution and increased level of noise during operation phase			Relate the assessment to: - the density and frequency of road use by vehicles - population distribution in relation to the proposed route
14	Safety/health risks related to the operations of the powerline?			Identify the potential risks such as electrical shocks, toxic substance leakage etc Most occupational health and safety issues during the construction, operation, maintenance, and decommissioning of electric power include exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery: · Live power lines · Working at height · Electric and magnetic fields · Exposure to chemicals

## FORM II-3 – ELIGIBILITY AND ENVIRONMENTAL IMPACTS SCREENING FOR WATER SUPPLY

### I Location

Province                      District                      Commune

### II Summary Scope of Work

	Quantity	Capacity	Location
- Ground water well development			
- Construction of pumping station			
- Construction of water treatment plant			
- Construction of distribution pipes			
- Chemical to be used for water disinfection			

### III Environmental Screening

	Screening question	Y	N	Action
<b>1</b>	Is there any section of the proposed water supply located within 1 km from any protected or environmental sensitive areas such as natural reserve, Park, protected areas, wet land?			Reroute or reselect the site to have the answer as “N” if possible otherwise exclude the proposal from LIFSAP financing
<b>2</b>	Is there any section of the proposed water supply affect any cultural heritage such as temples, church, graveyards, etc?			Reroute or reselect the site to have the answer as “N” if possible otherwise exclude the proposal from LIFSAP financing

### IV Environmental Check list

(WP)	Potential Impact	Describe
	Will the construction or upgrade of the power supply ...	<i>If “yes” then specify which activity (ies) cause the impacts, who are affected, scope, and duration. Provide figures about size, quantity and other relevant parameters where possible). Below are some suggestions:</i>
1	Groundwater pollution (applicable to cases where groundwater is used)	Assess the risks based on the relative distance between the proposed production wells and pollutant sources such as animal cages, toilets, waste dumping site, manure storage facility etc.. Consult hydrogeologist to get advise on the vulnerability regarding groundwater pollution potentials
2.	Health Risks to public if water quality does not meet standards	Compare water quality test results with Vietnamese drinking water quality standards issued at Decisions No. 1329/2002/BYT/QĐ, if water is supplied for domestic use.
3.	Vegetation clearance at the treatment facility and along pipes trenches	Provide information on the area, width and length of cleared area, density of vegetation on the ground, Type of trees/vegetation to be removed
4.	Reduced localised air quality due to dust and	Identify the sources of emission, such as: <ul style="list-style-type: none"> <li>○ Smoke from exhaust of vehicles and construction plants and</li> </ul>



(WP)	Potential Impact	Describe
	smoke	<p>increased traffic in the areas surrounding construction site</p> <ul style="list-style-type: none"> <li>○ Increased dusts level along the road used for transportation of granular construction materials drop</li> <li>○ Dusts from temporary loading of granular construction materials such</li> <li>○ Dusts from construction waste dumping sites</li> </ul> <p>Assess the level of impacts on local people and their daily activities, noticing:</p> <ul style="list-style-type: none"> <li>- The number and frequency of vehicles in use</li> <li>- The quantity of granular materials to be temporarily loaded at a time</li> <li>- The size of the granular materials</li> <li>- Weather conditions</li> <li>- Toxicity of the materials</li> <li>- The duration that granular materials is exposed freely to the air</li> <li>- The number of people /objects affected</li> </ul>
5.	Increased localized noise level and vibration	<p>Identify the sources of noise and vibration, for example</p> <ul style="list-style-type: none"> <li>○ Noise from engines of running vehicles, construction plants</li> <li>○ Noise from construction activities such as piling, excavation or installation of equipment, loading of construction materials, concrete pouring, drilling</li> </ul> <p>Assess the impacts of noise and vibration on local community, take in to account:</p> <p>The scope of impacts depends on:</p> <ul style="list-style-type: none"> <li>- The number, frequency and working durations of noise sources</li> <li>- Time of the day (night time)</li> <li>- Noise sensitivity of receptor (e.g. farmer's meeting)</li> </ul>
6.	Water pollution	○
7.	Solid Waste Management	<p>Specify the sources, such as:</p> <ul style="list-style-type: none"> <li>- Excavation sites</li> <li>- construction camps/sites</li> </ul> <p>assess the quantity and duration that solid waste generation takes place</p>
8.	Erosion control	<p>Identify the causes, e.g.</p> <ul style="list-style-type: none"> <li>- clearance of sites from vegetation, as well as the execution of excavation works using heavy equipment.</li> <li>- accidental or structural spillage of fuels, chemicals, sanitary wastewater, etc., as well as from leakage from inadequately protected solid waste storage facilities and sites.</li> <li>- Soil erosion /subsidence may also occur at excavation sites or dumping sites</li> </ul>
9.	Safety of the public	<p>Assess how the transportation of bulky items such as pre-cast equipment or pipes would affect the public.</p> <p>Also assess the risk associated with excavation works</p>
10.	Social and traffic Disturbance	<p>Assess the extend/tendency that concentration of workers from other areas would cause social disturbance to the stability of local's social settings and increased the risks of social evils</p>

<b>(WP)</b>	<b>Potential Impact</b>	<b>Describe</b>
		such as gambling or prostitutions. Relate the assessment on traffic disturbance to: - the density and frequency of road use by vehicles - population and housing distribution in relation to the proposed route
11.	Occupational health and safety of workers	Identify the potential risks such as electrical shocks, chemical leakage etc
12.	Interrupt or damage to existing infrastructure	Assess if the construction of the facilities within the water supply system including the treatment plants, pumping station and the pipes cause any interruption or damages to the existing infrastructure such as drainage channels, underground cable or other pipes etc.
13.	Chance finding procedures	Assess the possibility that during works being carried out at the sites or borrow pits, objects having archaeological / cultural or religious values or explosive materials may be discovered
14.	Increased Wastewater	Assess the impacts of the increased wastewater during the operation phase of the water supply based on: - the quantity of water to be supplied - The purpose of water use in serviced area - The availability and capacity of drainage/receptor
15.	potentially allow intrusion of contaminated water into ground water.	Assess this potential if ground water is used. Pay attention to high risks locations: - Ground and sealing conditions at the borehole/well
16.	Safety regarding chemical use for water treatment and disinfection	Name the chemicals anticipated to be used for water treatment disinfection, and assess the toxicity of these substances on human health and the environment.
17.	Disposal of sludge	Estimate the amount of the sludge to be generated from water treatment plant While the amount of sludge generated from small-scale groundwater treatment plant is minor, the amount of sludge from the one that surface water is used is much higher and its potential impacts need to be identified and managed.
18.	Mosquito breeding	Assess the potential impacts by making relations to: - existing condition of drainage in the serviced area - habit of local people on storing clean water

## ANNEX B: COMMON MITIGATION MEASURES FOR CIVIL WORKS

### B- Common Mitigation Measures for Civil Works

Mitigation Measures	Impacts to be mitigated
<p>Relocation of services shall be undertaken by the appropriate statutory authority.</p> <p>Any services are damaged by the Contractor, the Contractor shall:</p> <ul style="list-style-type: none"> <li>➤ report to the Engineer and</li> <li>➤ where safety is not an issue the Contractor carry out repairs to the damaged services as an immediate task.</li> <li>➤ The owner will advise the Engineer when the service has been adequately repaired.</li> <li>➤ Should the service be unable to be immediately re-instated the Contractor may be required to replace the lost services with other means and at the Contractor's cost</li> <li>➤ If construction obstruct access to houses/building, temporary alternative access must be provided by the contractor</li> </ul>	Impacts on existing services
<ul style="list-style-type: none"> <li>➤ Contractor shall spray water to control dust in roads under construction to the extent that sub-base materials is not wash off.</li> <li>➤ Under dusty work place conditions workers shall be provided with face masks, gloves.</li> <li>➤ The Contractor shall ensure that all equipment and materials loaded on trucks shall be covered during transportation</li> <li>➤ Properly covering the soil, sand on trucks dumps</li> <li>➤ Refill the excavated areas as soon as possible</li> <li>➤ Do not proceed excavation works in hot, dry and very strong wind conditions</li> <li>➤ Remove temporary stockpile as soon as possible.</li> <li>➤ The Contractor shall provide check and repair for equipment if necessary to ensure compliance with environmental standards</li> <li>➤ The Contractor shall turn off construction equipment when no construction activity is required.</li> </ul>	Dust and Smoke control
<ul style="list-style-type: none"> <li>➤ The Contractor is to maintain silencers on all equipment to the manufacturer's standard. Machinery and vehicles will be maintained in good working condition to minimize noise levels.</li> <li>➤ Vehicle operators required to minimize horn use on site, and avoid using concrete mixers near religious sites.</li> <li>➤ The Contractor is not to work between the hours of 22.00 and 07.00 within 500 m of houses or other permanent places where people live.</li> <li>➤ Consultation to community must be conducted and prior notice must be given to community if the contractor wish to carry out some works at night</li> <li>➤ The Contractor is required to provide suitable protective ear muffers to workers who operate excessively noisy equipment.</li> <li>➤ The Contractor is to seek the approval of the Engineer if vibratory equipment is to be used within 50 m of a building. The Contractor will be responsible for the repair of any damage to buildings that may arise from the use of vibratory equipment.</li> <li>➤ Excavation works should not be executed under aggressive weather</li> </ul>	Noise and Vibration Control

Mitigation Measures	Impacts to be mitigated
<p>conditions (rains, strong winds).</p> <ul style="list-style-type: none"> <li>➤ Topsoil should be removed and stored in separate piles and reinstated after refilling of trenches, to enable natural re-vegetation</li> <li>➤ Minimize the area of excavation and vegetation clearance</li> <li>➤ Improve drainage capacity for runoff through barren land create drains to minimize /channel rainwater runoff.</li> <li>➤ Water storage tanks and water production equipment frequently inspected for and leaks or damage.</li> <li>➤ All excavated material to be disposed of can only be disposed of in an approved site. If this is on private land the Contractor is to obtain approval from the occupier. If the site is on public land approval must be obtained from the PPC or DPC.</li> </ul>	
<ul style="list-style-type: none"> <li>➤ When all material is removed, the disposal area must be suitably shaped and finished so that the disposed site is stable and will not erode. This will normally require levelling and smoothing the heaped material so that an acceptable finish is achieved that allows the site to drain correctly.</li> <li>➤ Where the site will not have any immediate alternative use e.g. as a building site, the Engineer will direct the Contractor to re-vegetate the site</li> </ul>	Erosion control
<ul style="list-style-type: none"> <li>➤ When any construction activity is completed, the site should be cleaned up and all waste removed. This applies to both large and small work items. Waste may include rock and soil, plastic bags, cardboard, cement bags, reinforcing steel off-cuts, unused or spilt mortar and concrete, bitumen and fuel drums, abandoned machinery and equipment etc. The site is to be cleaned and re-instated and all of these materials and items removed and disposed of in a proper fashion.</li> <li>➤ The site must be cleared of all material that has been brought on-site by the Contractor. This includes the removal of all loose material and material that has bonded with the earth e.g. concrete and mortar, and fuel and lubricant spills (contaminated areas).</li> <li>➤ All areas are to be cleaned or contaminated areas dug up and the soil removed. The site is to be left in a stable and non-erodible condition.</li> <li>➤ Where required the site may require smoothing so that an acceptable finish is achieved that re-establishes the site drainage. Where the site is extensively disturbed the Engineer will direct the Contractor to re-vegetate the site.</li> <li>➤ All waste materials that cannot be recycled are to be removed and disposed of at a suitable waste site. If the site is state-owned, the constructor should have agreement from local authorities (DCP, CPC). In case it its private, agreement from owner/ manager is required.</li> <li>➤ Where material cannot be recycled or collected by scrap dealers all material that is to be disposed of can only be disposed of to an approved site. If this is on private land the Contractor is to obtain approval from the occupier. If the site is on public land approval must be obtained PPC or DPC.</li> <li>➤ For disposal on public property the Contractor must obtain a copy of</li> </ul>	Construction Waste Management

Mitigation Measures	Impacts to be mitigated
<p>the site approval which is issued by the relevant governmental agency. A copy of the approval is be handed to the Engineer and retained for his records. For disposal either on private or public land the Engineer is required to approve the site.</p>	
<ul style="list-style-type: none"> <li>○ Fuel, lubricants and other chemicals used for construction must be stored in water tight containers. No refuelling is allowed on farmland or close to water courses where spillage may contaminate soil and water resources.</li> <li>○ All waste oil is to be collected and disposed of according to oil industry standards.</li> <li>○ After cleaning, the wash down waste from bitumen heaters and bitumen drums are not to be disposed of in water courses where this may pollute the environment. Bitumen heater and bitumen drum wash down waste may be disposed of in deep trenches and covered over. The Engineer is to approve the location and sitting of waste trenches.</li> <li>○ Replace container and clean up immediately when leakages is discovered.</li> <li>○ Any spillage of fuel, lubricants and bitumen is to be cleaned up and contaminated soil removed and disposed of in a suitable place. Serious spillages are to be reported to the Engineer.</li> <li>○ Designate /allocate appropriate sanitation facility to be used by workers</li> <li>○ Where works take place adjacent to a watercourse, temporary sediment barriers should be installed on slopes to prevent silt from entering the watercourse</li> <li>○ Forbid discharge of wastewater from washing of construction tools, equipment and vehicles</li> <li>○ Avoid excavation works in rainy season or flood season</li> <li>○ Excavated soils should be reused as much as possible as filling material. Contaminated soil should be considered as waste material and disposed of accordingly. Excess soil should be disposed off at sites approved by the municipality. Topsoil should be removed and stored in separate piles and reinstated after refilling of trenches (if not contaminated).</li> </ul>	<p>Land/ Water contamination related to fuel, lubricants and solid wastes</p>
<ul style="list-style-type: none"> <li>○ Separated at generated source into regular (recyclable and non-recyclable waste) or hazardous solid waste.</li> <li>○ Paper, resin, iron and steel sold to other enterprises to recycle. Inorganic solid waste (concrete, bricks, etc.) will be disposed of properly. Unrecyclable domestic waste regularly collected/disposed in places approved by local authorities.</li> </ul>	

Mitigation Measures	Impacts to be mitigated
<p>The contractor shall be required to implement the following measures to ensure workplace safety for his employees</p> <ul style="list-style-type: none"> <li>○ Develop workplace safety regulations and monitor compliance</li> <li>○ Provide protective equipment for workers such as boots, hats and gloves</li> <li>○ Provide adequate medical testing and insurance for all employees.</li> <li>○ Provide adequate health and safety training of all employees, including training on specific procedures as appropriate to various individual staff groups. Training of basic rules with regard to protection of public health, including most importantly hygiene and disease prevention.</li> </ul>	Workplace safety
<p>The contractor shall be required to implement the following measures to ensure safety for the public</p> <ul style="list-style-type: none"> <li>○ Provide adequate provision of adequate sanitary, medical first-aid kits</li> <li>○ Properly packed bulky equipments on truck before departure</li> <li>○ Maintain speed limits while driving</li> <li>○ Arrange people to direct traffic flow when trucks carrying bulky materials entering the sites</li> </ul>	
<ul style="list-style-type: none"> <li>○ Avoid temporary loading of construction materials on the roads or other locations that obstructs traffic flows. When it is not avoidable, remove materials from the sites as soon as possible</li> <li>○ Place warning signs where construction sites near busy traffic, and excavation is on-going</li> </ul>	
<ul style="list-style-type: none"> <li>○ Maximize use of local labour for unskilled positions, in part to minimize the need for temporary camps, and also to ensure socioeconomic equity for the local population.</li> <li>○ If contractor bring in workers from outside and the issues likely to be occurred, they should not be accommodated within the community and camps should be located well away from the community.</li> <li>○ When the worker accommodation site is no longer required the Contractor will be responsible for closing and cleaning the campsite.</li> <li>○ Arrange people to direct traffic flow when trucks carrying bulky materials entering the sites</li> <li>○ Avoid temporary loading of construction materials on the roads or other locations that obstructs traffic flows. When it is not avoidable, remove materials from the sites as soon as possible</li> <li>○ Provide alternative access to houses if the main route is blocked</li> <li>○ The Contractor is required to provide the workers with suitable accommodation, potable water, cooking facilities, an energy source for cooking, sanitation facilities and solid and liquid waste collection and disposal facilities</li> </ul>	Social Disturbance
<ul style="list-style-type: none"> <li>➤ The Contractor shall ensure that his workforce is aware of HIV/AIDS.</li> <li>➤ The contractor shall arrange a discussion session with local authority / a health worker from surrounding health centres</li> </ul>	HIV/AIDs transmission prevention

Mitigation Measures	Impacts to be mitigated
<ul style="list-style-type: none"> <li>➤ If siting of the civil works find that the construction activities may affect there are graves/graveyards, relocation of these must be relocated prior to construction starts. Arrangements shall be made between PPMU, local authority and local people.</li> <li>➤ If cultural artefacts are uncovered the Contractor must stop work at the site, secure the site and inform the Engineer.</li> <li>➤ The construction supervisor will inform PPMU, and PPMU will inform the provincial Department of Cultural Affairs who will inspect the discovery and advise the Engineer as to what action is to be taken.</li> <li>➤ Following a discovery and after securing the site the Contractor should arrange with the Engineer to move his activities to another site.</li> </ul>	Discovery of Artefact
<ul style="list-style-type: none"> <li>➤ Procedures for dealing with emergency environmental situation such as chemical spillage shall be seriously studied and all staff shall be trained in appropriate action.</li> <li>➤ In case of environmental emergency, the Contractor shall immediately notify the Consultant who will instruct the Contractor on the next course of action. The Contractor shall immediately respond to the instruction from the Consultant to rectify the situation.</li> </ul>	Environmental Hazards
<p><u>Quarry Operations</u>  Quarries should be at least 500 m from residential areas so as to reduce dust and noise from these sites.  The Contractor apply dust suppression in any quarry where the Contractor employs labour.  In dusty conditions the Contractor will need to provide workers with face masks.  If the Contractor uses explosives the person handling the explosives must be licensed.  The Contractor is required to strip and remove topsoil to a suitable site so that it is available for re-use when the quarry is to be closed and the area rehabilitated.  The Contractor shall ensure that the open area is minimised by progressively rehabilitating the disturbed areas.  Long slopes that will be susceptible to erosion will need to have small level bunds constructed across the slope to break up and redirect runoff away from the re-establishment area.  Should the area not stabilise the Contractor will be required to repair the damage.</p>	Multiple impacts related to Quarry Operations
<p><u>Borrow Pits Operations and Rehabilitation</u>  Borrow pits should be at least 500 m from residential areas so as to reduce dust and noise from these sites.  Dust in borrow pits can be a concern especially to workers.  The Contractor will need to apply dust suppression in any borrow pit where the Contractor employs labour.  In dusty conditions the Contractor will need to provide workers with face masks.  Rehabilitation includes the reshaping of the excavated area so that it drains and does not allow pools of water to accumulate in the bottom of the quarry.</p>	Multiple impacts related to Quarry Operations

<b>Mitigation Measures</b>	<b>Impacts to be mitigated</b>
Topsoil is then re-spread over these areas for cultivation/ afforestation administered by local community	
<ul style="list-style-type: none"> <li>➤ Construction supervisor together with Contractor's representative to identify areas of road safety concern during and after construction. Install warning signs, traffic calming road measures, pull over areas</li> <li>Conduct road safety awareness campaigns through local commune (speakers)</li> </ul>	Road Safety during and after construction
<ul style="list-style-type: none"> <li>○ Conduct environmental awareness raising including water savings</li> <li>○ Maintenance drainage system regularly</li> </ul>	Increased wastewater generation
<ul style="list-style-type: none"> <li>○ Prioritise other water source such as rainwater supply if possible</li> <li>○ Ensure that ground water supply has proper casing by close supervision on the design.</li> <li>○ Supervise to make sure that the casings and water leakage prevention structures are properly constructed</li> <li>○ Maintain regular maintenance of well base</li> </ul>	Pollution of water source related to water supply
<ul style="list-style-type: none"> <li>○ Periodically clean up to remove sludges out of drains</li> <li>○ Regularly check and maintain the well/pump.</li> <li>○ Fix up the system timely when leakage is detected.</li> </ul>	Water pollution, nuisance to the public
<ul style="list-style-type: none"> <li>○ Periodically clean up to remove sludges out of drains</li> <li>○ Regularly check and maintain the well/pump.</li> <li>○ Fix up the system timely when leakage is detected.</li> </ul>	Local flooding
<ul style="list-style-type: none"> <li>○ Install and maintain cover on water storage tanks</li> <li>○ Improve localised drainage to minimise areas available for mosquito breeding</li> </ul>	Mosquito developing
<ul style="list-style-type: none"> <li>○ Place warning signs at sites having high risks of electrical shocks.</li> <li>○ Cut off power before repairs works is carried out</li> <li>○ Inform authorised people when failures are discovered</li> </ul>	Health risks relating to electrical shocks
<ul style="list-style-type: none"> <li>○ Place signboards at locations having accidental risks</li> <li>○ Conduct and maintain road safety campaign through local communication system</li> </ul>	Safety and health of the public relating to access road

## RECOMMENDED MONITORING CRITERIA

<b>Issue</b>	<b>Monitoring Criteria:</b>
Restore Revegetation	Revegetation must be successful over at least 75 percent of the area 2 weeks after using planting materials or 1 month after seeding.
Disposal of Excavated Material	Specified in the relevant Activity Sheet in Construction Methods.
Site Clean up and Disposal of Waste	As specified in Construction Methods for this Activity
Rehabilitation of Borrow Pits	As specified in Construction Methods for this Activity
Rehabilitation of Quarries	As specified in Construction Methods for this Activity
Removal and Reinstatement of Services	The re-instatement of the removed service in working condition.



Dust Control	Community and worker satisfaction with Contractor's dust control procedures.
Noise and Vibration Control	Community and worker satisfaction with the Contractor's procedures.
Fuel, oil and bitumen control	Fuel, oil and bitumen spills cleaned up and removed. No pollution occurrences of soil and/or water resources.
Employment of Unskilled Workers	Community and worker satisfaction with the Contractor's procedures.
Worker Health and Safety Issues	Work place accident record.
AIDS and HIV	Existence of an AIDS/HIV awareness program, records of the number of awareness raising visits and attendance records.
Road Safety	Road accidents that occur during (i) construction and (ii) operation.
Discovery of Cultural Artefacts	Safe removal and transfer of any unexpected discoveries of antiquities to the Ministry of Culture.

### **Chance Finding Procedures**

In case of an artifact discovered during the implementation earthworks, the procedures to be carried out shall be:

- contractor/workers immediately halt the work at the site;
- Contractor/workers protect the site and found objects, and report to the Site Supervisor.
- The Site Supervisor report to the Provincial Project Management Unit (PPMU) and the provincial Department of Culture, Sport and Tourism (DCST).
- Officer from DCST visit the site and carry out preliminary investigation to determine the significance of the object/the site.
- Then he/she will decide whether the workers can continue to work at the site, or contact the National Institute of Archaeology for further investigation.
- Contractor/Workers are allowed to resume their work if no further investigation is required, otherwise re-sitting of the civil works would be likely.

**B. Examples of EMPs for small scale Infrastructures**

**Access Road Upgrade**

**Table 6 EMP for Road Upgrading**

(R)	Potential Impact	Mitigating Action	Monitoring Method	Responsibility / Frequency
<b>Pre-Construction Phase</b>				
1	Vegetation clearance at the borrow pits, dumping sites and along the roads	<ul style="list-style-type: none"> <li>○ Only clearance of vegetation within the area needed and approved by the Engineer</li> <li>○ Rehabilitate vegetation cover before completion</li> </ul>	observation	Contractor, construction Supervisor, DARD. Daily
<b>Construction Phase</b>				
2	Air pollution	<ul style="list-style-type: none"> <li>○ Spray the road near houses/public buildings</li> <li>○ Properly covering the soil, sand on trucks</li> <li>○ Require transport vehicles owners to only use properly registered vehicles with mufflers to mitigate noise and emissions.</li> <li>○ Refill the pipe trenches as soon as possible</li> <li>○ Reuse excavated soil for refilling/levelling or transport excavated soil away from the site as soon as possible</li> <li>○ Do not proceed excavation works in hot, dry and very strong wind conditions</li> <li>○ Remove temporary stockpile as soon as possible.</li> <li>○ Turn engines off when vehicles are not operated</li> </ul>	Observation Interview affected people	Contractor, construction Supervisor, DARD Daily
3	Noise and vibration	<ul style="list-style-type: none"> <li>○ Vehicle operators required to minimize horn use on site, and avoid using concrete mixers near religious sites.</li> <li>○ Machinery and vehicles will be maintained in good working condition to minimize noise levels.</li> <li>○ Avoid activities generating high noise level at night time near</li> </ul>	Observation Interview affected people	Contractor, construction Supervisor, DARD Daily

<b>(R)</b>	<b>Potential Impact</b>	<b>Mitigating Action</b>	<b>Monitoring Method</b>	<b>Responsibility / Frequency</b>
		<p>residential areas. Inform/consult with local community if the works are executed at night time</p> <ul style="list-style-type: none"> <li>○ Inform community before the works started</li> </ul>		
4	Water pollution	<ul style="list-style-type: none"> <li>○ All fuel, lubricants and chemicals will be properly stored above ground and in water tight containers to avoid spills/leaks. Replace container and clean up immediately when leakages is discovered. Put materials containing pollutants at designated places.</li> <li>○ Water from construction sites, particularly runoff through excavated soil is not allowed to be discharged into water sources. Where works take place adjacent to a watercourse, sedimentation traps must be applied before the runoff enter water bodies</li> <li>○ discharge of wastewater from washing of construction tools, equipment and vehicles is forbidden</li> <li>○ Arrange for construction workers to share the latrines with local families or use public toilets near the site/where they stay at.</li> <li>○ Avoid excavation works in rainy season or flood season</li> </ul>	Observation Interview affected people	Contractor, construction Supervisor, DARD Daily
5	Solid Waste Management	<ul style="list-style-type: none"> <li>○ Separated at generated source into regular (recyclable and non-recyclable waste) or hazardous solid waste.</li> <li>○ Paper, resin, iron and steel sold to other enterprises to recycle. Inorganic solid waste (concrete, bricks, etc.) will be disposed of properly. Unrecyclable domestic waste regularly collected/disposed in places approved by local authorities.</li> <li>○ Excavated soils should be reused as much as possible as filling material. Contaminated soil should be considered as waste material and disposed of accordingly. Excess soil should be disposed off at sites approved by the municipality. Topsoil</li> </ul>	Observation	Contractor, construction Supervisor, DARD Daily

<b>(R)</b>	<b>Potential Impact</b>	<b>Mitigating Action</b>	<b>Monitoring Method</b>	<b>Responsibility / Frequency</b>
		<p>should be removed and stored in separate piles and reinstated after refilling of trenches (if not contaminated).</p> <ul style="list-style-type: none"> <li>○ Waste to be recycled, recovered or disposed off externally should be transferred through acknowledged recycling companies, where available.</li> <li>○ Provisional material storage on site should be designed and undertaken in such a way as to ensure that soils and underground water are not polluted.</li> </ul>		
6	Erosion control	<ul style="list-style-type: none"> <li>○ Excavation works should not be executed under aggressive weather conditions (rains, strong winds).</li> <li>○ Topsoil should be removed and stored in separate piles and reinstated after refilling of trenches, to enable natural re-vegetation.</li> <li>○ Minimize the area of excavation and vegetation clearance</li> <li>○ Improve drainage capacity for runoff through barren land by planting trees, bushes/grass or create drains to minimize /channel rainwater runoff.</li> <li>○ Water storage tanks and water production equipment frequently inspected for and leaks or damage.</li> </ul>	Observation	Contractor, construction Supervisor, DARD Weekly, After heavy rain
7	Safety of the public	<ul style="list-style-type: none"> <li>○ Maintain speed limits of heavy duty construction plants</li> <li>○ Avoid temporary loading of construction materials on the roads or other locations that obstructs traffic flows. When it is not avoidable, remove materials from the sites as soon as possible</li> <li>○ Place warning signs where construction sites near busy traffic, and excavation is on-going</li> </ul>	Visually inspect safety equipment use, observe vehicle noise levels. Interview locals	Contractor, construction Supervisor, DARD Daily weekly
8.	Social Disturbance	<ul style="list-style-type: none"> <li>○ Maximize use of local labour for unskilled positions, in part to minimize the need for temporary camps, and also to ensure socioeconomic equity for the local population.</li> <li>○ Arrange people to direct traffic flow when trucks carrying</li> </ul>	Confirm source(s) of labour.	Contractor, construction Supervisor, DARD

<b>(R)</b>	<b>Potential Impact</b>	<b>Mitigating Action</b>	<b>Monitoring Method</b>	<b>Responsibility / Frequency</b>
		bulky materials entering the sites <ul style="list-style-type: none"> <li>○ Avoid temporary loading of construction materials on the roads or other locations that obstructs traffic flows. When it is not avoidable, remove materials from the sites as soon as possible</li> <li>○ Provide alternative access to houses if the main route is blocked</li> </ul>		
9.	Occupational health and safety of workers	<ul style="list-style-type: none"> <li>○ Develop workplace safety regulations and monitor compliance</li> <li>○ Provide protective equipment for workers such as boots, hats and gloves</li> <li>○ Provide adequate medical testing and insurance for all employees.</li> <li>○ Provide adequate health and safety training of all employees, including training on specific procedures as appropriate to various individual staff groups. Training of basic rules with regard to protection of public health, including most importantly hygiene and disease prevention.</li> <li>○ Provide adequate provision of adequate sanitary, medical first-aid kits</li> </ul>	Observation Interview workers	Contractor, construction Supervisor, DARD monthly
10.	Damage to existing infrastructure	<ul style="list-style-type: none"> <li>○ Compensate for any damages caused</li> </ul>	observation	Contractor, construction Supervisor, DARD Before commissioning
11.	Chance finding procedures	<ul style="list-style-type: none"> <li>○ If cultural artefacts are uncovered the Contractor must stop work at the site, secure the site and inform the Engineer. The Engineer will inform the provincial Department of Cultural and Information who will inspect the discovery and advise the Engineer as to what action is to be taken. Following a discovery and after securing the site the Contractor should</li> </ul>		Contractor and DARD, if it occurred

<b>(R)</b>	<b>Potential Impact</b>	<b>Mitigating Action</b>	<b>Monitoring Method</b>	<b>Responsibility / Frequency</b>
		arrange with the Engineer to move his activities to another site.		
<b>Post-Construction Phase</b>				
12.	Increased Noise and dust level along the roads	<ul style="list-style-type: none"> <li>○ Place speed limit signboards at areas near residential areas or public building</li> <li>○ Spray water in hot, dry weather in sections crossing the house</li> </ul>	Visually confirm water reuse.	Contractor, construction Supervisor, DARD
13.	Traffic Safety	<ul style="list-style-type: none"> <li>○ Place speed limit signboards at areas near residential areas or public building</li> <li>○ Conduct awareness raising</li> </ul>		Local households, Local authorities implement the mitigation measures

**ATTACHMENT 3: ELIGIBILITY, ENVIRONMENTAL IMPACTS SCREENING AND GUIDELINES OF MITIGATION MEASURES FOR SLAUGHTERHOUSES AND WET MARKETS**

**ANNEX A: ELIGIBILITY AND ENVIRONMENTAL IMPACTS SCREENING FORMS**

**FORM III-1 – SCREENING FOR ELIGIBILITY OF SLAUGHTER HOUSES**

**I - Location of Slaughter House:**

Province:                      District:                      Commune:

**II – Screening Questions**

	<b>Screening Question</b>	<b>Y</b>	<b>N</b>	<b>Unknown</b>
1.	Is the location of the slaughter house in line with local authority’s long-term land use planning?			
2.	Is the slaughterhouse located at least 1 km from a residential area?			
3.	Does the slaughter house is accessible to clean water and sufficient power supply			
4.	Does the slaughterhouse has sufficient space for the construction and maintenance of waste water treatment and waste management facilities?			
5.	Does the slaughter house threatened by urban expansion in the next ten years?			
6.	Will the construction/upgrading of the slaughter house affect any cultural heritages such as pagodas, churches, temples or graveyards?			

**III - Conclusion:**

(a) - Questions 1 to 4 has Y answer and Questions 5 and 6 have N answer → Slaughter house is eligible for LIFSAP financing

(b) – the answers are different from (a) → Slaughter house is NOT eligible for LIFSAP financing


Screened by

Date

Approved by

## FORM III-2 – ENVIRONMENTAL SCREENING FOR SLAUGHTER HOUSES

### I Location

Province

District

Commune

### II Summary Scope of Work

- upgrading the building:
- Construction/upgrade drainage system
- Construction/upgrade waste treatment facility
- provision of equipment (specify)
- Others (specify)

### III Environmental Screening for Slaughterhouse

(SL)	Question	Y	N	Mitigation measures if the respond is "Y"
	<b>PREPARATION PHASE</b> Does the design of the slaughterhouse satisfy that...			
1	It is properly isolated from the surrounding objects, e.g. houses?			
2	"clean" and "dirty" areas are adequately separated			
3	The building is sufficiently ventilated			
4	The floor is drained well?			
5	waste and wastewater treatment facilities are located at end of predominant wind direction?			
6	The design of the wall, ceiling, lighting systems etc. ensure that deposition of substances is minimal and it is easy to clean up?			
	<b>CONSTRUCTION PHASE</b> Will construction/upgrade of slaughterhouse...			
7	Generate dust and smoke?			Select appropriate measure listed in Section B of Annex 2
8	Cause increase in localized noise level and vibration			As above
9	Affect public safety during upgrading?			As above



(SL)	Question	Y	N	Mitigation measures if the respond is "Y"
10	Interrupt or damage to existing infrastructure			As above
11	Cause social and traffic Disturbance			As above
	<b>OPERATION PHASE</b> Will the operation of slaughterhouse			
12	having 'dirty' and "clean" areas separated adequately			Select appropriate measures listed in Section
13	The floor is drained adequately, i.e. wastewater flow from "clean" to "dirty area"			
14	Sanitation conditions within the slaughtering building is well managed?			
15	The workers are aware of and follow safety procedures for human when dealing with animal?			
16	Operational rules are set to ensure food safety			

Prepared by

Date

Approved by

## FORM III-3 – ENVIRONMENTAL SCREENING FOR WET MARKETS

### I Location

Province

District

Commune

### II Summary Scope of Work

- upgrading the building:
- Construction/upgrade drainage system
- Construction/upgrade waste treatment facility
- provision of equipment (specify)
- Others (specify)

### III Environmental Checklist for Wet markets

	Question	Y	N	Mitigation measures if the respond is “Y”
	<b>CONSTRUCTION PHASE</b>			
	Will construction/upgrade of wet markets cause...			
1.	Generate dust and smoke?			Select appropriate measure listed in Section B of Annex 2
2.	Cause increase in localized noise level and vibration			As above
3.	Affect public safety during upgrading?			As above
4.	Interrupt or damage to existing infrastructure			As above
5.	Cause social and traffic Disturbance			As above
6.	Cause difficulties for business operation of some households			
	<b>OPERATION PHASE</b>			

	<b>Question</b>	<b>Y</b>	<b>N</b>	<b>Mitigation measures if the respond is "Y"</b>
7	The market has sufficient water supply and distribution for cleaning?			Select appropriate measures listed in Section C.2
8.	People from the market is accessible to sanitation facility			As above
9	Daily cleaning of meat tables is arranged?			As above
10	Market floor is well drained and can be cleaned easily?			As above
11	The waste is collected daily and dumped at approved sites?			As above

Prepared by

Date

Approved by

## ANNEX B: COMMON ENVIRONMENTAL MEASURES

### B. Environmental Mitigation Measures

#### B.1 Recommended Slaughter Houses Site Selection and Operational Rules

##### Eligibility Criteria

The following are the criteria to be applied in selecting slaughterhouses to participate in the project:

1. The site is in line with local authority's long-term land use planning
2. The site is at least 1 km from a residential area.
3. The site should not be threatened by urban expansion within the next 10 year.
4. The slaughter house is accessible to clean water and sufficient power supply
5. The slaughterhouse has sufficient space for the construction and maintenance of an effective waste water treatment and waste management.
6. The construction, upgrading or operation of slaughterhouse will not affect any cultural heritages such as pagodas, temples, graveyards etc.

##### Requirements on structure and layout of the Slaughter House

###### *Food and biosafety for the Slaughtering building*

- Slaughterhouse should be designed in such a way that ensure "clean" and "dirty" areas are separated
- Slaughter house should be separated from the surroundings by walls
- Plant trees at appropriate locations to prevent wind and dust from outside
- There must be adequate lighting in the slaughtering area to allow effective inspection.
- The internal walls must be lined with smooth and impermeable, easy to clean materials such as tiles
- The internal walls and the ceiling must be smooth and in light colour to limit the deposition of concentration and fugal.
- The floor must be lined with durable and smooth but not slippery materials
- Steps on the floor should be avoided. A 45o angle should be created where there are changes in elevation of the floor
- The floor should be constructed with sufficient slop so as water can be drained well, the floor is not flooded
- The slaughterhouse is sufficiently ventilated
- The windows and gates should be painted for easy cleaning

###### *Animal Keeping Area*

- Must be located at the end of wind direction
- Must be roofed and drained properly
- There would be an assigned area in which animals suspected of being diseased can be held - depending the level of risk, they would be destroyed and the carcass would be disposed of or

if appropriate they would be slaughtered last and the decision to accept the all or part of the meat would be made based on post-mortem inspection).

#### *Waste water and Wastes Management Facilities*

- Wastewater and solid waste treatment facilities should be located at the end of predominant wind direction.
- Drainage must flow in the direction from “clean” (meat processing) to “unclean” operations (live animal holding areas, killing, dehairing). Drainage should be covered style and ensure that there is no stagnant water on the floor. Screen should be installed at collection points and manholes to prevent solids from coming into the drains.
- Waste bins should have lids
- There must be adequate toilet facilities and wash basins available to workers and they must be kept in a clean condition. Toilet facility should be at the end of wind direction from the slaughtering/meat keeping area

#### **Operational Requirements**

The following minimum operational standards are proposed for slaughterhouses that are participating in the project:

- Do not use any part of the slaughterhouse as resident
- Do not keep other animals such as dogs, birds etc in the slaughter house
- Water quality should be tested on a regular basis (at least every six months).
- There must be adequate lighting throughout the slaughter floor to allow effect anti-mortem inspection.
- The building should be ventilated
- There must be adequate toilet facilities and wash basins available to workers and they must be kept in a clean condition.
- Hot water must be available for the cleaning of equipment
- There must be facilities for stunning the animals prior to bleeding and a clean receptacle must be available for collection of blood and it must then be processed in a clean area but away from the main slaughter floor
- De-hairing of pigs should be carried out on a properly designed table – not on the floor
- Carcasses must not be processed on the floor and must be suspended on rails or a “gamble” or be placed in a raised cradle after completing the de-hairing process.
- There must be facilities to remove the intestinal tract unopened from the clean area of the slaughter floor and it must be processed in away from the main slaughter floor.
- Tools used in opening and splitting the carcass must be regularly cleaned in hot water.
- All workers should be required to start the shift in clean clothing.
- The workforce must be organized in a manner that ensures that movement from the “dirty” area to the clean area is minimized, and workers responsible for the work in the “dirty” area should not be assigned to duties in the clean area during the same shift – (unless they shower and put on clean clothing).
- Slaughterhouse management board must ensure that all meat from the slaughterhouse is transported in clean conditions and must record must identify of the person collecting the carcasses supplied by a particular producer.

## **B.2 Recommended Operational Commitment Requirements for wet markets**

Plans for upgrading the market would need to demonstrate that, on completion the market would have achieved certain minimum standards of cleanliness and operational effectiveness. These would include

- Adequate water supply and distribution
- An area in which hands and utensils can be washed
- An accessible toilet block for market patrons and stall holders
- Stainless steel tables
- Floor surfaces that are well drained and can be easily cleaned
- A centralized daily cleaning service that is being adequately funded by the stall holders
- Hygiene inspections that are being carried out by market management on a daily basis
- Proper management of all waste products – particularly waste water.
- The upgrade of the market is only in consideration when the market management board can prove their capability the free trading of meat and the actions that do not follow the regulations in the market.

**ATTACHMENT 4: GUIDELINES OF MITIGATION MEASURES - CATEGORY III  
ACTIVITIES – NON STRUCTURAL WORKS**

ANNEX A: GUIDELINES OF ENVIRONMENTAL MEASURES

Farmers and workers at slaughter houses should be trained to adopt the following practices to ensure biosafety:

**Table 7 Biosafety Rules**

<b>Potential Issue</b>	<b>Measures to be practiced by farmers / Slaughter house workers</b>
<p>Prevent animal-human transmissible disease: adapted from WHO Vietnam's recommendations during Bird flu out breaks</p>	<ul style="list-style-type: none"> <li>▪ Regularly clean the areas where animals are kept:               <ul style="list-style-type: none"> <li>• Wear a mask and gloves.</li> <li>• Remove all feathers and feces.</li> <li>• The ground where animal walked should be cleaned with a broom.</li> <li>• Animal building or cages whether made with bricks or wood must be: WASHED =&gt; BRUSHED =&gt; CLEANED with allowable disinfectant.</li> <li>• Be careful and wash hands after cleaning these areas.</li> <li>• Compost manure before using as fertilizer</li> </ul> </li> </ul> <p><b>Proper handling of animals that are ill, suspected of having a disease or dead is an important control measure to prevent the spread of the disease:</b></p> <ul style="list-style-type: none"> <li>▪ If sick and dead animal is encountered, inform the animal health workers of commune immediately.</li> <li>▪ If need to handle dead or sick animal, wear protective clothing such as a mask, goggles, gown, rubber boots and gloves. If these are not available, cover mouth with a piece of cloth, wear glasses, use plastic bags to cover hands and shoes and fix these tightly around wrists and ankles with a rubber band or string.</li> <li>▪ After removing gloves and protective gear, wash hands with soap and water</li> <li>▪ Make sure to keep children away from dead or sick animal.</li> <li>▪ Never eat dead or sick animal</li> <li>▪ Never sell sick or dead animal</li> <li>▪ Never throw dead animals in to the river or pond.</li> </ul>
<p>Treat dead animals</p>	<p><b>Dead animals and their feces should be buried or burnt:</b></p> <ul style="list-style-type: none"> <li>▪ As much as possible, seek assistance from local <i>animal health workers</i> on how to dispose dead animals safely.</li> <li>▪ All dead birds and other contaminated objects (for instance: manure, eggs, blood, feathers, egg, crates) must be destroyed properly as soon as possible through:</li> </ul> <p><b>Burning</b> Place all the birds and objects in a container, carefully add some paraffin / kerosene / diesel and light a fire. Petrol is highly flammable and can cause explosions. <b>Petrol should not be used.</b></p>

	<p><b>Burying</b>  Dig a hole (far from a well, pond, animals) in the ground, put some quicklime at the bottom and on the borders of the hole; put all the animals and objects in the hole; cover with quicklime; cove with earth.</p> <ul style="list-style-type: none"> <li>• When burying dead animals or their feces, try to avoid generating dust. Dead birds should be put immediately in a bag, then bury animals carcass and feces at a depth of at least 1 meter. Never throw dead animals in the river.</li> <li>• When the dead animals and their feces have been properly disposed, clean and disinfect all areas very well.</li> <li>• The ground where animals walked should be cleaned first (with a broom) then use disinfectants.</li> <li>• Quicklime is the cheapest disinfectant and should be used for ground and poultry housing. <ul style="list-style-type: none"> <li>▪ Spraying of disinfectants on vegetated outdoor areas or soil is of limited value due to the inactivation of these chemicals by organic material.</li> <li>▪ After the area has been cleaned, remove all the protective materials and wash hands with soap and water.</li> <li>▪ Wash clothes in hot or warm soapy water. Hang them in the sun to dry.</li> <li>▪ Put used gloves and any other disposable materials in a plastic bag for safe disposal.</li> <li>▪ Clean all reusable items such as rubber boots and glasses/goggles with water and detergent, but always remember to wash your hands after handling these items.</li> <li>▪ Items that cannot be cleaned properly should be destroyed.</li> <li>▪ Shower/wash body using soap and water. .</li> <li>▪ Take care not to re-contaminate yourself or the cleaned area by avoiding contact with dirty, contaminated clothes and items.</li> <li>▪ Most importantly, wash your hands every time after handling any contaminated items.</li> </ul> </li> </ul> <p><b>Footwear should also be decontaminated:</b></p> <ul style="list-style-type: none"> <li>▪ After walking around areas that may be contaminated (such as farms, markets or backyards with poultry), clean your shoes as carefully as possible with soap and water.</li> <li>▪ When cleaning shoes, make sure that you do not flick any particles into your face or on your clothes. Wear a plastic bag over your hands, shield your eyes by wearing glasses or goggles, and cover your mouth and nose with a cloth.</li> <li>▪ Leave dirty boots and shoes outside the home until they have been thoroughly cleaned.</li> </ul>
Disease prevention	<ul style="list-style-type: none"> <li>➤ Avoid direct contact with livestock or cleaning the livestock farms</li> <li>➤ Wash hand thoroughly after in contact with livestock</li> <li>➤ Visit the nearest clinic if has body temperature &gt;38oC</li> <li>➤ Periodically clean up livestock cages/storage area</li> <li>➤ Wear protective clothing and masks when in close distance with animals</li> <li>➤ Inform local veterinary promptly if discover sick or death livestock</li> </ul>



**Table 8 Lists of of drugs, chemicals, antibiotics banned for veterinary uses**

*(To enclosed the promulgation of this Circular No. 15/2009/TT-BNN dated 17/03/2009 of Head of the Ministry of Agriculture and Rural Development)*

No.	Chemicals, antibiotics
1	Chloramphenicol (Other names: Chloromycetin;Chlornitromycin; Laevomycin,Chlorocid, Leukomycin)
2	Furazolidon và dẫn xuất của nhóm Nitrofuran (Nitrofurán, Furacillin, Nitrofurazon, Furacin, Nitrofurantoin, Furoxon, Orafuran, Furadonin, Furadantin, Furaltadon, Payzone, Furazolin, Nitrofurmethon, Nitrofuridin, Nitrovin)
3	Dimetridazole (Other name: Emtryl)
4	Metronidazole (Tên khác: Trichomonacid, Flagyl, Klion, Avimetronid)
5	Dipterex (Other name: Metriphonat,Trichlorphon, Neguvon, Chlorophos,DTHP); DDVP (Tên khác Dichlorvos; Dichlorovos)
6	Eprofloxacin
7	Ciprofloxacin
8	Ofloxacin
9	Carbadox
10	Olaquidox
11	Bacitracin Zn
12	<b>(removed)</b>
13	Green Malachite
14	Gentian Violet (Crystal violet)

**Table 9 List of drugs, chemicals, antibiotics limited for veterinary uses**

*(To enclosed the promulgation of this Circular No. 15/2009/TT-BNN dated 17/03/2009 of Head of the Ministry of Agriculture and Rural Development)*

No.		Chemicals, antibiotics
1		Improvac (No. Of registration: PFU-85 by Pfizer Australia Pty Limited)
2		Spiramycin
3		Avoparcin
4		Virginiamycin
5		Meticlorpidol
6		Meticlorpidol/Methylbenzoquate
7		Amprolium (powder)
8		Amprolium/ethopate
9		Nicarbazin
10		Flavophospholipol
11		Salinomycin
12		Avilamycin
13		Monensin
14		Tylosin phosphate

**Table 10 Mitigation Measures Applicable to Laboratory Operation**

**Laboratory design**

- Laboratory is designed for easy cleaning
- Eyewash should be made available in laboratory
- Safety shower should be made available
- All shelves are secured

**General practices and procedures**

- Food for human consumption must be stored outside the laboratory
- Microwave oven(s) clearly labelled “No Food Preparation, Laboratory Use Only”
- Eating, drinking, smoking and/or applying of cosmetics occurring in the laboratory is forbidden
- Mouth pipeting is prohibited
- Mechanical pipeting devices available and used
- Protective laboratory clothing stored separately from street clothing

**General laboratory housekeeping**

- Laboratory equipment properly labelled (biohazardous, radioactive, toxic, etc.)
- Do not leave glass containers on the floor
- Broken glassware handled by mechanical means (brush and dustpan, tongs, etc.)
- Sink available for hand-washing

- Chemicals should not be stored on the floor
- Chemical containers should not be left open after use
- All solutions properly should be labelled

### **Occupational health safety**

- Personal protective equipment (gloves, gowns, goggles, etc.) should be made available
- Laboratory coats, gowns, and other personal protective should not be worn outside the laboratory
- Gloves and other protective clothing must be worn for unpacking specimens and other analytical operations
- First aid kits will be made available

### **Waste Management**

- Wastes must be segregated in proper containers
- Contaminated materials will be disposed of into a leak proof, puncture-resistant waste disposal container.
- Chemical waste containers must be tagged, labelled and kept closed
- Chemical waste containers appropriately handled and stored
- Sharps containers used and disposed of properly
- Ensure that there is no trash on floor
- Waste disposal procedures posted in laboratory

### **Fire protection**

- Sprinkler heads free and unobstructed