PROJECT EXECUTIVE SUMMARY
GEF COUNCIL INTERSESSIONAL WORK PROGRAM SUBMISSION

AGENCY’S PROJECT ID: GE-P079610
GEFSEC PROJECT ID: 2138
COUNTRY: People’s Republic of China, Kingdom of Thailand, Socialist Republic of Vietnam
PROJECT TITLE: Livestock Waste Management in East Asia

GEF AGENCY: World Bank
OTHER EXECUTING AGENCIES: Ministry of Finance, China; Guangdong Provincial Government, China; Ministry of Agriculture and Cooperatives, Thailand; Ministry of Natural Resources and Environment, Vietnam; UN Food and Agriculture Organization
DURATION: 5 years

GEF FOCAL AREA: International Waters
GEF OPERATIONAL PROGRAM: OP 10
GEF STRATEGIC PRIORITY: IW 1 and IW 3
Pipeline Entry Date: June 13, 2003
ESTIMATED STARTING DATE: December 16, 2005
IA FEE: $693,000
CONTRIBUTION TO KEY INDICATORS OF THE BUSINESS PLAN: Re. IW Strategic Priority #1, the project will contribute to the GEF target of doubling the number of trans-boundary water bodies in which it catalyzes financial mobilization for the implementation of stress reduction measures. Re. IW priority #3, the project will demonstrate the local feasibility of technology innovations to address global water issues related to land-based pollution sources.

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT(S):

Mr. Jinlin Yang, Director Division II, Ministry of Finance, GEF OFP China;  
Date: July 16, 2002 (China)

Dr. Wanee Samphantharak, Deputy Secretary-General, Office of Environmental Policy and Planning, GEF OFP Thailand;  
September 20, 2002 (Thailand)

Mr. Nguyen Ngoc Sinh, Vice Chairman of GEF-Vietnam Committee, General Director of National Environment Agency, GEF OFP Vietnam;  
May 27, 2002 (Vietnam)

Approved on behalf of the World Bank. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for work program inclusion.

Steve Gorman  
GEF Executive Coordinator  
Date: February 17, 2005

Robin Broadfield  
Project Contact Person  
Tel. and email: 1-202-473-4355,  
Rbroadfield@worldbank.org

<table>
<thead>
<tr>
<th>FINANCING PLAN (US$)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GEF PROJECT/COMPONENT</strong></td>
<td><strong>Amount</strong></td>
</tr>
<tr>
<td>Project</td>
<td>$7,000,000</td>
</tr>
<tr>
<td>PDF A</td>
<td>$700,000</td>
</tr>
<tr>
<td>PDF B</td>
<td>$700,000</td>
</tr>
<tr>
<td>Sub-Total GEF</td>
<td>$7,700,000</td>
</tr>
<tr>
<td><strong>CO-FINANCING</strong></td>
<td></td>
</tr>
<tr>
<td>GEF Agency</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>$10,055,000</td>
</tr>
<tr>
<td>Bilateral</td>
<td></td>
</tr>
<tr>
<td>NGOs</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>$6,955,000</td>
</tr>
<tr>
<td>Sub-Total Co-financing</td>
<td>$17,010,000</td>
</tr>
<tr>
<td>Total Project Financing</td>
<td>$24,710,000</td>
</tr>
<tr>
<td>FINANCING FOR ASSOCIATED ACTIVITIES: PRD ENV PROG 437,350,000</td>
<td></td>
</tr>
<tr>
<td>LEVERAGED RESOURCES:</td>
<td>48,400,000</td>
</tr>
</tbody>
</table>

*Details provided under the Financial Modality and Cost Effectiveness section*
2. PROJECT SUMMARY

a) PROJECT RATIONALE.

This proposed regional project will reduce land-based pollution of the South China Sea, one of the World’s large marine ecosystems (LME) and a focus of GEF support. The South China Sea feeds millions of people and is one of the World’s most biologically diverse LMEs. But it is severely stressed, mainly by over-fishing and pollution. The UNEP/GEF project “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” is helping the littoral states develop and implement a Strategic Action Plan (SAP) to address these key threats. Its trans-boundary diagnostic analysis has identified land-based pollution as a major threat and agriculture as the second largest source (after human waste). A major and potentially manageable source of agricultural pollution is concentrated “industrial” livestock production (China, Thailand and Vietnam produce over 50% of the World’s pigs and nearly 30% of its chickens). This industry produces more unprocessed waste and discharges in particular nitrates and phosphates than the neighboring land can absorb. Concentrated livestock production is also a major threat to human health, as evidenced by the recent SARS and Bird Flu outbreaks.

Reflecting the urgency of the livestock waste management problem, several of the littoral states have asked the World Bank and GEF to help them address it immediately and in parallel with the SAP development process through this proposed project.

The project is consistent with the objectives of and will contribute to a proposed World Bank/GEF Strategic Partnership to accelerate action to reduce pollution of the East Asian Seas (see p.8). Its collaborative regional approach to removing the barriers to environmentally-sound livestock waste management is rational and cost-effective because the littoral nations all face similar barriers – absence of adequate site location and decision support tools, inadequate policy and regulatory systems and limited knowledge of and experience with cost-effective waste management technologies. Hence the same or a similar strategic approach will work in different countries and each country can learn from the experience of others. The project’s public/private partnership approach to this challenge is also logical because governments are responsible for land use decision making and environmental regulation and industrial livestock production is a private sector activity.

To achieve maximum impact from a proposed modest GEF resource input, the project will pilot options and demonstrate mitigation technologies in three of East Asia’s regional industrial livestock production areas and pollution hot-spots - China’s Guangdong Province, the Hanoi and Ho Chi Minh City areas of Vietnam, and central Thailand. A regional coordination and replication mechanism will disseminate its results and promote replication throughout the participating countries and in Laos, Cambodia and Philippines, which have also asked for World Bank/GEF assistance with this problem.

The project builds substantially on foundational industrial livestock waste management assistance from the multi-donor FAO Livestock Environment and Development Initiative (LEAD). Through the project, the World Bank will strategically expand this assistance into policy reform and investment demonstrations and then will mainstream livestock waste management into its country assistance dialogues, thereby promoting its scale-up and replication.
PROJECT OBJECTIVES

The project’s development objective is to reduce the major negative environmental and health impacts of rapidly increasing concentrated livestock production on the open waters of and thus on the people of south-east Asia. Its global environment objective is to reduce livestock induced, land-based pollution and environmental degradation of the South China Sea and Gulf of Thailand.

b) PROJECT OUTPUTS AND ACTIVITIES.

On-the-ground demonstrations of innovative, cost-effective livestock waste management techniques by private livestock producers and implementation of a replication action plan for them will be the project’s principal outputs, as agreed at pipeline entry. Reflecting this emphasis, nearly 60% of total project cost is budgeted for livestock waste management technology demonstration activities. The following table shows the total project costs by component and by co-financier.

<table>
<thead>
<tr>
<th>Component</th>
<th>GEF</th>
<th>Government</th>
<th>Private Sector</th>
<th>FAO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock Waste Management Technology Demonstration</td>
<td>3.5</td>
<td>3.9</td>
<td>6.2</td>
<td>-</td>
<td>13.6</td>
</tr>
<tr>
<td>Policy and Regulatory Development</td>
<td>1.5</td>
<td>3.2</td>
<td>0.1</td>
<td>-</td>
<td>4.8</td>
</tr>
<tr>
<td>Project Management and Monitoring</td>
<td>1.0</td>
<td>3.0</td>
<td>0.1</td>
<td>-</td>
<td>4.1</td>
</tr>
<tr>
<td>Regional Support Services</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>7.0</td>
<td>10.1</td>
<td>6.4</td>
<td>0.5</td>
<td>24.0</td>
</tr>
</tbody>
</table>

The project design is tailored to fit the specific livestock rearing conditions in the three participating countries, particularly the different average size of pig farms, which are its main target. In Thailand and China, large sized industrial pig farms are dominant, while in Vietnam, pig farms are typically small scale, involving confined household-based production that is concentrated in particular villages. This structure of Vietnamese rural society requires that the project’s demonstration activities be conducted on a communal (village) rather than individual farm basis. The targeted project demonstration farms are all located within the concentrated livestock production jurisdictions bordering South China Sea and Gulf of Thailand (cf. maps).

Map 1: Estimated pig Densities in Participating Countries (1998 to 2000)
The project will support activities under the following four project components to be implemented over a period of five years with focus on on-the-ground demonstration, policy development and regulatory enforcement.

(i) **Livestock Waste Management Technology Demonstration Component - US$13.6 million (of which GEF US$3.5 million).** This component will finance the development and construction of cost-effective and replicable livestock waste management systems and facilities and the implementation of effective waste management approaches in selected areas with a high concentration of intensive pig farms. Its goal is to demonstrate technically, geographically, economically and institutionally workable solutions to reduce regionally-critical livestock waste pollution caused by industrial livestock production under the different political and social situations of the participating countries. The livestock waste management strategies promoted under this component will focus on reducing excess nutrients (nitrates and phosphates in particular) and human health risks. The methods to be used would include (a) reducing, through better feeding practices, the volume of nutrients emission; (b) getting the nutrients back into the crop cycle; (c) processing and packaging the nutrients for export to other areas for crop use; (d) converting the nutrients to plant-available forms; (e) destroying the nutrients; and (f) taking measures to minimize potential transmission of pathogens, antibiotics and their resistance strains from livestock to human being. Specific activities of the component would include:

1. **Selection of demonstration farms and villages.** The selection will be made according to selection criteria agreed with the Bank, which would be updated periodically during project implementation as needed and included in the Project Implementation Plan (PIP) of each country. Key criteria require the farms or villages to be selected should (i) be large sized pig farms in China and Thailand or villages with large number of confined household-based pig farms in Vietnam; (ii) be willing to participate with co-financing commitment; (iii) be located in an area where pig production is the dominant cause of water pollution; (iv) be located in an area where the trend is increasing or steady in pig production; (v) be
located in an area ideally representing a single geographical catchment area or a micro watershed draining to a single surface stream; (vi) be located within the identified concentrated livestock production jurisdictions. Farms and villages would be selected on a yearly basis to allow the process of improved planning and to adjust for changes and incorporate lessons learned from demonstrations in earlier years of project implementation. A first group of demonstration farms and villages has been selected and agreed by the Bank including 6 industrial pig farms in Thailand, 8 large sized pig farms in China and 2 villages with over 100 small, confined pig production households each in Vietnam. All these demonstration farms are located within the identified project areas. Details of the selected first group of demonstration farms and the identified project areas are presented in annex 4 of the Project Brief.

(2) **Technical design of waste management demonstrations.** Technical design would include (a) decision on specific technologies to apply, (b) preparation of implementation reports to include required information, total cost estimate and cost sharing planning, and (c) technical review by designated reviewer(s). Specific design of technology and management demonstration for each farm and village would vary due to different livestock production practices, environmental policies, livestock waste management strategies and farming practices.

(3) **Implementation arrangements.** Project implementation would include (a) agreements with implementing agencies at all levels and participating farms to specify obligations for co-financing for construction and operations, progress reporting, allowing access to samplers for regular monitoring activities and visitors for dissemination and replication purposes, attending training and stakeholder meetings, (b) contract processing with contractors or local governments to carry out construction works, (c) construction supervision according to technical design, testing and operating of the completed facilities.

(4) **Training and Extension.** The demonstration activities would be supported by training and extension to provide (a) farmers with the essential skills and technical support needed to improve their on-farm manure management practices and (b) capacity building. The training and extension approach is to provide technical consultation and advice first to farmers participating in the project, then to other livestock farmers in the project areas, and finally to further to livestock farmers in other parts of the country. Capacity building is crucial to the effort to address livestock waste pollution issues and to test the feasibility and replicability of livestock waste management practices and technologies. Activities would include training of animal husbandry extension agents, farmer associations and planning officers, study tours for participating farmers on demonstration farms, preparation of training manuals, collaboration with livestock extension projects, etc. A detailed master capacity building development plan is under preparation by each country which will be reviewed by the Bank appraisal mission.

(ii) **Policy and Regulatory Development Component - US$4.8 million (of which GEF US$1.5 million).** This component would support setting up a policy and regulatory framework for environmentally sustainable development of livestock production in each country that will induce further policy reforms and encourage farmers to adopt improved
manure management practices. This will be achieved through: (a) the development of a replication strategy; (b) the review and revision of existing regulations; (c) the commitment to master planning of livestock production (at national and provincial levels) to direct the geographic focus of future intensive livestock production; (d) the development and introduction of codes of practice or best waste management practices; and (e) the development and introduction of livestock waste recycling and discharge standards. Specific policy packages will be tested in sub-national jurisdictions and testing experience will feed back into the policy and regulatory development subcomponent. Code of Practices or Best Management Practices will be tested in synergy with the Livestock Waste Management Technology Demonstration component, which will promote cost-effective and replicable technical options. This component will also support awareness raising activities, focusing on policy measures and environment and public health issues associated with inadequate manure management. This will focus the attention of national and local governments on livestock waste policy and regulatory enforcement and facilitate further assistance with this challenge from the World Bank and other donors.

(iii) Project Management and Monitoring Component - US$4.1 million (of which GEF US$1.0 million). This component would support efficient project management and effective monitoring and evaluation of the social, economic, environmental, and other changes brought about by the project, and the dissemination of project outcomes within the respective participating countries. Replication potential of alternative livestock waste management technologies as related to farm scale, affordability, operational capacity, material availability, and compatibility to the waste handling methods of the local farm communities would be assessed to achieve widespread replication of the tested manure management practices throughout the three participating countries. Monitoring on human health risks associated with the project will focus on measures taken to minimize potential transmission of pathogens, antibiotics and their resistance strains from livestock to human being.

(iv) Regional Support Services Component - US$1.5 million (of which GEF US$1.0 million). This component would provide regional coordination and facilitation support to achieve cross-country synergies and regional replication. This component would respond to the participating countries’ need for an easily accessible source of regional support services, including support for decision tools development, evaluation of project activities and outcomes, development of training modules and packages, and the dissemination cross the three participating countries and beyond.

c) KEY INDICATORS

The project's key indicators were established during project baseline studies and include process indicators, stress reduction indicators and environmental status indicators relevant to International Waters Projects. They include (i) reduced livestock production related emissions of pollutants in surface water systems of project areas, including nitrates, phosphates, BOD, COD and E. coli; (ii) the number and size of confined livestock producers within the demonstration areas preparing and adopting pollution control practices demonstrated through the project; (iii) improved spatial distribution planning for livestock production facilities (to better match waste production and land absorption capacity); (iv) local and national adoption and enforcement of suitable policies
and regulations for addressing livestock waste management-related pollution; (v) reduced human health risk as a result of minimized transmission potential of pathogens, antibiotics and virus from fish to human being; and (vi) increased public awareness and regional exchange of information on pollution threats and health problems from livestock waste, as shown in government and World Bank policy documents.

d) PROJECT ASSUMPTIONS AND RISKS (FROM LOGFRAME)

The project’s major risks include the following (i) inadequate collaboration among key agencies. Agricultural and environmental ministries in the countries involved have sometimes non-compatible interests and are not accustomed to working together; (ii) lack of participation and weak support of local populations and civil society as well as a weak partnership with the private sector; (iii) failure in coordination among participating countries due to ineffective regional coordination arrangement, lack of country ownership, failure to observe commitment etc.; (iv) operational failure risk resulting from (a) inadequate financial incentives for the private sector to invest in waste management systems; (b) inadequate political will and human resources to enforce nutrient management regulations; (c) lack of local community and farmers support for maintaining communal systems; (d) operational and management support not available or inadequately accessible, (e) counterpart funding contributions not available on time; and (v) technical failure occurring as a result of (a) inappropriate choice of technology and system, (b) design, equipment, or material failure, and (c) farm expansion.

A specific risk which has been accorded the Bank task team’s close attention is the potential transmission of pathogens, antibiotics and their resistance strains from livestock to human being under the project. To minimize this risk, the following measures have been agreed that all participating farms will (a) treat all pig manure through aerobic or anaerobic process including composting, covered lagoon, anaerobic digester etc. before they are used on cropland, in fish pond, or marketed; (b) reduce use of antibiotics; (c) not rear any ducks on the same farms to minimize risk of forming new strain of influenza virus since human flu virus and a duck virus are very similar. It is expected that such potential transmission incidence, not a result of the project, will be greatly reduced through implementation of these measures.

3. COUNTRY OWNERSHIP

A) COUNTRY ELIGIBILITY

The countries are eligible under paragraph 9(b) of the GEF Instrument. The proposed project is consistent with the relevant provisions of regional and global conventions relating to International Waters to which the countries are signatories or contracting parties. They are active partners in the GEF-supported East Asian Seas and South China Sea/Gulf of Thailand large marine ecosystem management projects that provide a strategic under-pinning for the project.

B) COUNTRY DRIVEN-NESS

All three participating countries have recognized the negative effects of industrial livestock production on the environment. However, they lack (i) technical solutions to address and deal with the problem of nutrient imbalance and (ii) policy instruments for industrial livestock production specific management and mechanism for law enforcement
and coordination among government agencies. Consequently, they endorsed the proposed project as a means to tackle this issue and as a national priority for GEF support. The proposed project will use a regional approach, initiated by the participating countries and based on the UN Food and Agricultural Organization’s (FAO) regional experience in environmentally sound livestock waste management, to develop and implement effective environmentally-friendly solutions to increasing livestock production under different social, political, institutional, economic, agronomic, geographic and climatic conditions.

4. PROGRAM AND POLICY CONFORMITY

A) FIT TO GEF OPERATIONAL PROGRAM AND STRATEGIC PRIORITY

The project is fully consistent with GEF International Waters Focal Area Strategic Priorities IW1 - catalyzing financial resource mobilization for implementation of reforms and stressing reduction measures through agreed Trans-boundary Diagnostic Analysis and Strategic Action Plans, and IW3 - innovative demonstrations for reducing contaminants - in this case by introducing and demonstrating sustainable industrial livestock management techniques. The project is also fully consistent with OP10, the Contaminant-based Operational Program. The project will also contribute to the objectives of the GEF Focal Areas of Climate Change and Biodiversity and to OP14, Draft Elements of an Operational Program for Reducing and Eliminating Releases of Persistent Organic Pollutants into the Environment.

Recognizing its significant biological diversity, the tremendous local importance of its marine resources, the global significance of the South China Sea and the need to address the major environmental threats it faces, the GEF has developed and is seeking to expand a marine management assistance program for the East Asian Seas. The proposed project would catalyze immediate action on the serious and largely unaddressed environmental threat from livestock waste to these Seas and will thus contribute to this program.

The project is also consistent with the proposed objectives and potential eligibility criteria of a possible GEF/World Bank Strategic Partnership for a Land-based Pollution Fund for the Large Marine Ecosystems of East Asia that is under development to further scale-up this program. The objective of this Partnership would be to demonstrate and encourage replication of innovative, more cost-effective ways to reduce land-based pollution of the large marine ecosystems of East Asia and to stimulate private investment in such measures. The Partnership is expected to focus on both wastewater treatment and one or two regional and/or national projects to reduce agricultural pollution.

B) SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY)

The project is designed to be sustainable in several respects. To the extent possible, the project will rely on technologies that are cost-effective, replicable and environmentally sustainable. For technologies such as improved feed efficiency or fertilization techniques that lower production cost, sustainability would be inherent. The project would ensure that manure treatment systems promoted under the project would have sufficiently low operation and maintenance costs to be financially sustainable by livestock producers.

To a large extent, the project’s long-term sustainability would be ensured through strengthening of regulatory frameworks for the livestock sector. While there are risks of insufficient enforcement when these affect profitable economic activities, the project
would attempt to mitigate such risks in several ways: (i) Sustainable solutions to ensure the private sector’s willingness to invest in livestock waste management technologies would be sought through increased stakeholder participation in the decision-making process, including favorable pricing policies for livestock waste management systems’ outputs such as bio-gas, electricity and organic fertilizer; (ii) Raising of public awareness would encourage local communities to seek more consistent enforcement of environmentally-friendly solutions; and (iii) Strengthening of public institutions and systematic monitoring of livestock development policies, including their environmental impact, would lead to improvements in each country’s capacity for sustainable livestock development, as well as benefits for the global environment. The project’s monitoring and evaluation plans will ensure that its environmental and social benefits are adequately measured, valued and disseminated which would further promote its sustainability. The governments of the participating countries have provided assurances about the priority nature of this project and their commitment to ensure adequate government support, including financial resources for sustainability beyond the successful completion of this project.

C) Replicability

The project will have only limited direct impact on water quality of the South China Sea, since the selected demonstration areas represent negligible fractions of the total pollution load. Consequently it has been designed to maximize replicability beyond its immediate impact area. A noticeable pollution reduction in the South China Sea catchment areas therefore can be achieved through the replication of the demonstrated livestock waste management practices throughout the participating countries and in other countries bordering the South China Sea. Specific project activities for replication of improved livestock waste management approaches would be (i) preparation and implementation of a replication strategy; (ii) specialized training, cross-visits and study tours for interested farmers, local officials, decision makers etc.; (iii) engaging farmers groups, local communities, NGOs, government agencies and other stakeholders; (iv) support for local pressure through public-awareness building; and (v) dissemination of demonstration results through targeted workshops and development of internet portal for in-country as well as regional replication.

The aim of the project’s replication strategy is integration of the project’s successful demonstrations into each country’s overall livestock waste management strategy and their scaling up. During this process, opportunities for integrating livestock waste management activities in future World Bank and other donor investments would be sought, using mechanisms such as the proposed regional World Bank/GEF Strategic Partnership for pollution reduction. Through the project’s regional dissemination activities, which would target primarily the three participating countries but eventually also other riparian countries draining into the South China Sea, other countries in the region could benefit from the knowledge and experience gained under the project. The project would also intend to provide valuable experiences beyond the East Asia region. Close cooperation with other international livestock management projects and assistance agencies would ensure that a successful project approach can be replicated in other regions that face similar environmental problems from industrial livestock production. The project would
ensure that all aspects of its design and implementation are well documented and easily publicly available to support dissemination and replication efforts.

D) STAKEHOLDER INVOLVEMENT

All participating countries recognized that stakeholder participation in decision-making for design, preparation, implementation and review of project interventions is critical for verifying that policy development initiatives are relevant, socially sensible and realistic, and to ensure a high level of targeted industrial livestock producers’ adoption of the demonstrated technologies. All the key stakeholders have been involved in project preparation and will be continuously involved in project implementation. The proposed project has already won strong support from intensive livestock producers, NGOs and government authorities at national, provincial and local levels, which jointly are guiding the project preparation.

Draft stakeholder participation plans are under preparation by the participating countries and will detail the participation and consultation mechanisms to facilitate the participation of all stakeholders, especially industrial livestock producers. These plans will be reviewed by the Bank’s appraisal mission, reflected in the Project Brief and included in the Project Implementation Plans of participating countries. Two rounds of public consultation for the project-affected people have been conducted during project preparation. The following approaches were taken for public consultation (i) consultation meetings with local residents, communities, local government representatives, and (ii) questionnaire analysis of public opinion supplemented by interviews. NGOs, including local environmental protection activists, farmer groups, and women’s associations were consulted and actively involved in project development throughout the project preparation. They will continue to play an important role in project implementation, especially in monitoring and evaluation. Government agencies including Ministry of Public Health in all three countries have been the decisive force leading the project preparation in their respective countries. Project related information and the safeguard documentation have been translated into national languages and disclosed to the general public at all levels including farm and village levels. FAO/LEAD has also made strong commitment to co-financing the project and participating in project implementation of the Regional Support Services Component. Annex 10 of the Project Brief provides more details.

E) MONITORING AND EVALUATION

A draft M&E Plan has been prepared by each participating country and included in country-specific Project Implementation Plans. These draft M&E Plans have been reviewed by the World Bank, which provided detailed comments and recommendations. The M&E Plans will be finalized at project appraisal. The task team will make sure that process indicators, stress reduction indicators and environmental status indicators relevant to International Waters Projects are included in the finalized M&E Plans.

The M&E Plans will specify the details of the scope of and activities for monitoring and evaluation. The scope will include (i) nitrate, phosphates and BOD, COD and E. coli discharge at the end-of-pipe of the individual farms or community, and at critical downstream locations; (ii) number of standing pig population covered by farms adopting sound livestock waste management systems; and (iii) extent of awareness and regional
exchange of information on pollution threats and health problems from livestock waste. The activities will include: (i) implementation progress monitoring, which will include monitoring of the status of project implementation progress indicators and policy and regulatory development indicators; (ii) livestock waste management system monitoring, which will include, at farm and community level, the monitoring of system efficiency and the effect of the project manure management interventions on public and animal health; (iii) environmental management monitoring, which will include monitoring of the major physical, chemical, and biological characteristics of unit processes, or surface and ground water measurement (where applicable) within project areas (micro-watersheds) and at the end-of-pipe on demonstration farms; (iv) project impact monitoring, which will include monitoring of the implementation of stakeholder participation plans, annual social impact review and public consultation, impact on human health, and long-term project impact; and (v) other monitoring of additional parameters required for achieving project objectives. Annex B provides the details.

Specific plans for monitoring the long-term project impact will be developed during project implementation and finalized at project completion. This may include (i) a Bank post completion evaluation mission to visit the participating countries within 3-5 years upon project completion, (ii) a follow-up study by FAO/LEAD in the participating countries for project impact evaluation, (iii) defining and development of tools to measure leveraged investment, and (iv) continuous dissemination of project impact results through an internet portal on “livestock waste management in East Asia” to be established during the project implementation based in FAO/LEAD.

5. FINANCIAL MODALITY AND COST EFFECTIVENESS

The project's total cost is estimated at US$24.0 million, which includes US$13.6 million for Livestock Waste Management Technology Demonstration, US$4.8 million for Policy and Regulatory Development, US$4.1 million for Project Management and Monitoring and US$1.5 million for Regional Support Services. The project will be co-financed by GEF (US$7.0 million), governments (US$10.1 million), private sector (US$6.4 million), and FAO (US$0.5 million). Over the period 2005-2015 the project aims to leverage about US$48 million of additional private investment in on-farm livestock waste management.

<table>
<thead>
<tr>
<th>Co-financing Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Co-financier (source)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Sub-Total Co-financing</td>
</tr>
</tbody>
</table>

6. INSTITUTIONAL COORDINATION AND SUPPORT

A) CORE COMMITMENTS AND LINKAGES

Industrial livestock production has grown rapidly in China, Thailand and Vietnam over the past 10 years. However, the countries have difficulties to organize a systematic effort
to manage its major environmental impacts. Consequently, it has become a major threat to their environmentally sustainable development. In response, the World Bank, in partnership with FAO, has agreed to expand its agricultural and land-based pollution assistance program in the three countries, beginning with this demonstration project, to help them address this threat. This project has incorporated key lessons and experience from other World Bank/GEF supported rural environmental and livestock projects particularly in East Asia region.

The project is fully consistent with both (a) the goal of the World Bank’s Country Assistance Strategies (CAS) for China, Thailand and Vietnam, which is to help them reduce poverty through rapid economic growth that is environmentally sustainable; and (b) the Bank’s agricultural and pollution reduction assistance strategies and programs for the three countries. Through this project, livestock waste management is expected to attract more attention of the participating countries and likely become a part of future CAS dialogues between the Bank and these countries. More specifically, in Guangdong Province, China, the project will expand the scope of and is integrated with an on-going World Bank/GEF point-source pollution reduction program that, until now, has focused exclusively on the Pearl River Delta urban area and did not address up-stream non-point source agricultural pollution. In Vietnam, the project will similarly expand the scope of a large, on-going World Bank urban pollution reduction program. In Thailand, the project is consistent with and will expand the Bank’s environmental assistance program on the key problem of water pollution.

Within the participating countries, the project will strengthen currently weak linkages and collaboration between the ministries responsible for agriculture development, environmental protection and public health on this key issue. Regional linkages will be ensured through (i) the Regional Coordination Group, with the Regional Facilitation Office as its secretariat; (ii) an internet portal on “livestock waste management in East Asia” to be established based on the FAO/LEAD virtual center; and (iii) implementation of the Regional Support Services Component.

B) CONSULTATION, COORDINATION AND COLLABORATION WITH IAS AND EXAS.

The project is an action priority of both the GEF/UNDP/IMO PEMSEA-facilitated “Sustainable Development Strategy for the Seas of East Asia” and the GEF/UNEP “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” project. The latter project’s Pollution Working Group has been briefed on it and has warmly welcomed and endorsed it as a priority component of its pollution reduction action plan. The project’s M&E system will be linked to the UNEP/GEF project’s M&E system and its outputs shared with its Secretariat.

The project is an initial World Bank contribution to a proposed GEF Strategic Partnership to reduce land-based pollution of the Seas of East Asia that the littoral states have called for. Its regional approach will maximize its contribution to this Partnership and to the two large marine ecosystem management Action Programs that will guide it by (a) involving the region’s three most important countries, in terms of livestock production and waste pollution; (b) promoting their common interest in protecting ecosystems of the South China Sea; (c) facilitating cross-country synergies are promoted; (d) encouraging replication throughout the region.
Project preparation incorporated experience and lessons learned from many other international and national initiatives and programs already existing or underway in the countries around the South China Sea. Close consultation and coordination has been established and will be maintained with many of these projects and programs, specifically including Reversing Degradation Trends in the South China Sea and the Gulf of Thailand Project (UNEP/GEF), Mekong River Basin Water Utilization Project (World Bank/GEF), Bio-gas Development Project in Vietnam (Netherlands), Guangdong Pearl River Delta Urban Environment Project (World Bank/GEF) and regional AWI Pilot Projects (FAO).

Collaboration with FAO has been ongoing since project conceptualization and will continue through the project. FAO is a partner to the Bank in assisting countries bordering the South China Sea in addressing livestock waste management issues. This partnership is based on FAO’s unique role in intergovernmental policy dialogues and strong engagement in livestock waste management through LEAD, which has broad experience and technical capacities to provide regional support services. FAO/LEAD has developed a strong research network in East Asia and other regions that the project will benefit from. FAO/LEAD will also maintain a presence in the region after project implementation, ensuring knowledge sharing with and replication in neighboring countries. This role of FAO/LEAD is complementary to that of the Bank, which will be to ensure scaling-up adoption of livestock waste management technologies, coordinated with policy and regulatory development.

C) PROJECT IMPLEMENTATION ARRANGEMENT

A Regional Coordination Group, consisting of representatives of each participating country and FAO, will be set up to provide overall coordination among and facilitation to all participating countries. The Regional Coordination Group will also review and approve the annual work plan for implementation of the Regional Support Services Component. Within each country, the project will utilize existing institutional mechanisms. A National Steering Committee, consisting of members from key government agencies and academies involved in livestock waste management including the ministries responsible for livestock production, environmental protection and public health, has been set up at national level with overall responsibility for project preparation and implementation in respective country. A national Project Management Office will be established as the secretariat of, reporting directly to respective National Steering Committee and responsible for day to day project administration. The national Project Management Offices will be located in one of the key ministries with members from other ministries. Project management structure below the national level varies from one country to another and is described in detail in the Project Brief. Guangdong is the only province in China supported by this project. It has gained extensive experience from implementation of various other World Bank/GEF supported projects and has made additional institutional arrangements for project preparation and implementation, including a provincial Project Leading Group and a Project Management Office under the provincial Department of Finance. A national Project Expert Group is also in place to provide technical support to the project. FAO/LEAD, a multi-donor funded program with secretariat provided by the FAO, will not be involved in project implementation at the country level, but be responsible for implementation of the Regional Support Services component through the Regional Facilitation Office. This office will be established at
project effectiveness and physically located in FAO's Bangkok office in Thailand. The private sector will be responsible for implementation on the demonstration farms and villages.
ANNEX A: INCREMENTAL COST ANALYSIS

1. Broad Development Goals and the Baseline

China (Guangdong Province), Thailand, and Vietnam have recognized the negative environmental impact of intensive livestock production and join in this project to seek solutions for protecting the environment from the impact of the growing industrialization of livestock production. However, in these countries livestock waste management has only within the past five years begun to be seriously addressed.

**China.** China is in the process of developing and strengthening regulations to reduce the negative environmental impact of intensive livestock production and intends to use a combination of regulations and economic instruments. In 1996, the Ministry of Agriculture (MOA) introduced a regulation requiring all new large-scale livestock farms to establish manure storage facilities. In 1998, the State Environmental Protection Agency (SEPA) began to evaluate pollution from livestock production and in 1999 a new division focusing on environmental pollution from agriculture was established. In May 2001, the Government established environmental management regulations affecting the livestock industry, and in January 2002 it established pollutant emission standards with regard to the breeding industry.\(^1\) A new regulation by SEPA on "Pollution Material Emission Standard for Animal and Poultry Industry" became effective on January 1, 2003. Additionally, a Government program on renewable energy promotes the formulation of biogas from livestock waste. The MOA, based on its ten year plan, will construct around 300 demonstration projects which will be based on the local specifications.

**Thailand.** Thailand has also established plans and regulations to reduce the negative impact of livestock production on the environment. Five plans are relevant to livestock waste management: (a) the National Economic and Social Development Plans; (b) the Enhancement and Conservation of National Environmental Quality Act; (c) the Policy and Plan for National Environmental Quality Preservation and Promotion; (d) the Environmental Quality Management Action Plan; and (e) the Energy Conservation Promotion Act. The 9th National Economic and Social Development Plan contained provisions that require the use of zoning for animal production, the registration of animal and other farms, and the education of farmers on livestock waste management. The Pollution Control Department (PCD) listed pig farms in February 2001 as a pollution point source that needed to be regulated. The waste water standards differ by farm size and standards were to be enforced for large and medium scale pig farms from February 2002 initially. These regulations are not yet enforced for small-scale farms, but are used for promotional incentives. Aside from PCD monitoring of wastewater from pig farms, the Department of Livestock Development (DLD) has established standards for all livestock farms. These farm standards are voluntary and rarely observed by farm owners, except by poultry farmers, as their products are exported.

**Vietnam.** While few environmental policies at the national level in Vietnam are specific to agriculture and regulations are largely based on industrial pollutants, regulations

---

\(^1\) Specific laws and regulations are: *Law of Environmental Protection (1989)*, *Decree on Control and Management of Pollution by Livestock Production* (SEPA Decree 9 – May 2001) and *Standards for Waste Discharge from Livestock Production* (GB18596-2001).
pertaining to livestock production are implemented at the provincial level. Long An province has implemented regulations to relocate large-scale livestock farms and slaughter houses out of urban areas. Dong Nai province has developed regulations to protect the environment from livestock production activities, which define the size of the livestock farms and address treatment of dead animals, animal waste, and waste water. Binh Duong province has developed a master plan that identifies specialization areas for livestock production (Tan Uyen and Ben Cat districts) and newly established large-scale livestock farm are required to have an appropriate waste treatment system. The province of Ho Chi Minh City has relocated some state-owned livestock farms. The impact of regulations implemented at the provincial level has been uneven and a clear national policy that can be implemented and enforced more widely is needed.

2. Baseline Scenario

The baseline response to these problems is inadequate both from a local and global environment perspective. Without a new approach to livestock waste management, countervailing tendencies to concentrated livestock production will not be strong enough to overcome the incentives driving it and thus the impact of livestock pollution on the south China Sea will increase. Without the proposed project, private sector investment in livestock waste management and the development and implementation of policies and tools to address the problem are likely to be delayed by many years. In the meantime, more industrial livestock farms will be established around the major cities of the sub-region; they will dump increasing quantities of untreated livestock waste into surface waters and on peri-urban land, worsening pollution loads in local streams and rivers flowing into the South China Sea. This will accelerate the loss of biodiversity and precious coral reefs and reduce the sustainable supply of marine resources in the South China Sea, as well as increase human health problems.

While steps are being taken to improve environmental protection, such actions are still inadequate with ongoing growth of intensified livestock production. The prevailing trend can be expected to continue or worsen over the period to 2020, despite some countervailing tendencies stemming from: (a) increasing environmental awareness as information improves and incomes rise; (b) improvement in transport and other infrastructure for livestock marketing; and (c) increasing urban-rural cost differentials for land and labor which should make peri-urban livestock production relatively less attractive.

Under the baseline scenario, basic on-farm investments, some strengthening of government regulatory activities and limited government support for livestock waste management investments can be expected. These activities would generally only respond to the immediate impacts or symptoms of the problem as perceived at the local level (e.g. odor, flies, and public health) and would not seriously address the problem of nutrient balance. As a result, the imbalance between the level of nutrient inputs and absorptive capacity of the land would worsen. With industrial livestock production systems growing rapidly and soils already largely saturated, excess P and N from these industrial farms would leach into waterways. The already high levels of nutrient loading (as much as 2-4 tons P and 3-6 tons N per square kilometer) could easily double over the next decade. These huge nutrient surpluses ultimately would drain into the South China Sea, seriously
affecting unique mangrove, coral and sea grass resources, as well as already-threatened shellfish species.

Most government expenditure for livestock waste management is for programs supporting installation of on-farm biogas plants or other basic technologies which help mitigate some of the most obvious problems and contribute to energy conservation but do not significantly remove excess nutrients. Spending for specific programs has totaled US$1.64 million in Thailand since 1996, US$2.4 million in Vietnam since 2002 (US$0.8 million from the Netherlands and US$1.6 million of farmer investment), and US$0.73 million in Guangdong since 2002 (see Table 1 of Annex 15 of the Project Brief). Based on discussions with governments, national programs will continue in these areas but without the project and as in the past, will focus on on-farm investments to meet domestic objectives. The livestock waste management investments identified by governments did not include past or future investment in policy development or monitoring, thus it will be assumed that any direct investment in policy development and monitoring (Components 2 and 3) under the baseline scenario would be insignificant, or zero. Since regional coordination is a new concept directly related to the project, the baseline under Component 4 is also assumed to be zero.

To obtain an estimate of the baseline under Component 1 (demonstration of livestock waste management), on-farm investments were considered. In order to raise the standards of manure management on all intensive pig farms to a level acceptable by current domestic standards, it is estimated that livestock waste management investments of the order of US$3–5 per head of the standing pig population (SPP) are needed. Such standards would aim to prevent regular discharge of fresh manure and untreated wastewater into waterways and the creation of environmental nuisance such as excessive flies and odor. This level of investment, and the environmental standards it aims to achieve, is referred to as “Level 1”.

The level of increased investment for the baseline on-farm investment were made as follows: First, the pig stock was estimated at project onset (2005), end (2010) and five years after the project ends (2015)\(^2\), on the basis of current stocks, and estimating that future growth will continue at the same pace of average yearly growth rates over the period 1990 to 2000 (see Table 2 of Annex 15 of the Project Brief). Second, the pig stock inventory in industrial systems was estimated on the basis of its current share, and on the conservative assumption that 80% of the stock growth will occur in industrial/intensive systems (see Table 3 of Annex 15 of the Project Brief). Third, incremental investment costs were estimated assuming baseline adoption levels and cumulative adoption rates for 2010 and 2015 (see Table 4 of Annex 15 of the Project Brief). Estimates of on-farm investment are assumed to include government subsidies to adoption of livestock waste management. The on-farm investment from 2005 to 2010 in the baseline scenario results a total of US$14.8 million indicating the amount as baseline spending for Component 1.

3. **Global Environmental Objective**

\(^2\) Investment level to 2015 is considered to provide an estimate of the leveraged on-farm investment as a result of the Project. Many of the project investments in improving the regulatory framework will have the greatest impact after the life of the Project.
The regional GEF/UNDP/IMO Partnerships for the Environmental Protection and Management of the East Asian Seas Project has identified agriculture, and particularly livestock production, as a major source of land-based pollution of its target ecosystems. China, Thailand and Vietnam alone accounted for over 50 percent of global pig production and almost one-third of poultry. Population growth, urbanization and income growth are fuelling rapid growth in demand for livestock products. Intensive forms of livestock production are appearing rapidly and in the future most livestock products that reach the market will come from large-scale intensive production units. From 1990 large-scale, industrial production comprises 80 percent of the growth in livestock production in Asia. These structural changes in the industry are causing the environmental problems to be addressed by this project.

The majority of intensive production units are located around major urban centers in or close to the coastal regions of the South China Sea. It is advantageous for enterprises to be close to the consumer and feed and input markets, especially given that infrastructure is still not well developed including roads, cold chains, marketing and handling facilities. Most feed inputs are purchased concentrates and 70 percent of the nutrients contained in animal feed are not retained in the animal’s body but excreted. Thus there is an excessive concentration of nitrogen (N) and phosphorus (P) compounds in the periphery of these urban areas, which results in significant water, land, and air pollution.

The Global Environmental Objective of the project is to reduce land-based pollution and environmental degradation of the South China Sea and Gulf of Thailand. The project will also have global benefits by providing a model for an integrated and regional approach to livestock waste management that can be replicated in other East and Southeast Asian countries as well as in other regions of the world.

4. The GEF Alternative

The GEF Alternative scenario would finance the incremental costs of moving from the business-as-usual approach of ineffectively addressing local, visible environmental problems created by intensive livestock production to a strategic framework for livestock production development which is environmentally more sustainable. The scenario would comprise (i) on-farm demonstration and replication of innovative technologies for livestock waste management; (ii) adoption of regulations for livestock waste management; (iii) the introduction of improved spatial distribution planning of intensive livestock production to improve nutrient balances; (iv) relevant training, extension and awareness-raising in the countries concerned; (v) monitoring and evaluation of project impacts, and (vi) regional coordination for improved livestock waste management.

The GEF Alternative would involve a substantial volume of additional private and public sector investment by the three countries in implementing waste management strategies, to reduce excess nutrients entering domestic waterways and the South China Sea. The GEF Alternative under Component 1 will involve additional on-farm investment as part of the project, as well as leveraged on-farm investment that will occur as a result of the project without being a part of project activities. US$4.8 million would be invested in policy development activities through the proposed project, including strengthening regulations, policy testing, capacity building, and awareness raising. US$4.1 million would be invested in project management, monitoring and evaluation. US$1.5 million would be
invested in regional support services activities which would involve support and coordination of national efforts, including provision of tools for policy-making, support for capacity building, and regional knowledge sharing.

To predict on-farm investment in the GEF Alternative, the baseline estimates of stock numbers were applied to conservative estimates of increased adoption as a result of the project. The GEF Alternative also takes into account higher levels of investment at the farm level outside of the project. Level 1 standards (as discussed in Section 2) of manure management, although attainable in principle by all specialized pig farmers, would not be sufficient to achieve the global environmental objective of the project, to prevent excess nutrients (essentially N and P) and other polluting compounds from livestock waste reaching the South China Sea. To achieve the global environmental objective a significantly higher standard of livestock waste management is required, that effectively prevents discharge of any untreated livestock waste into the waterways that has not been treated to a satisfactory standard. Achieving this higher standard (“Level 2”) is considered feasible using combinations of waste treatment technologies, recycling methods and measures to minimize human health risks. These measures would focus on minimizing potential transmission of pathogens, antibiotics and their resistance strains from livestock to human being.

On average, the investment needed to attain a Level 2 standard is estimated in the order of US$8–12 per SPP, implying an average incremental investment of US$6 per SPP. At the same time there would be additional benefits to the domestic environment, beyond those currently targeted, in terms of reduced water pollution and public health risk. Higher adoption rates were estimated in specific areas where the project will focus its policy, demonstration and training activities. The project will monitor adoption rates of both Level 1 and Level 2 standards in project areas.

It is estimated that during the period 2005-2015, about US$48.4 million (excluding project costs for ‘Technology Demonstration under Component 1) of additional (leveraged) investment in on-farm livestock waste management would be made as a consequence of the project. The GEF Alternative of US$34.4 million under Component 1, comprising on-farm investment in livestock waste management technologies and related training, includes baseline investment (US$14.8 million), project investment (US$13.6 million) and estimated leveraged on-farm investment (US$6.0 million) during the project period (see Table 1 below).

Table 1. Summary On-Farm Investment Incremental Costs

<table>
<thead>
<tr>
<th>Investment</th>
<th>Project duration 2005 to 2010 (US$ million)</th>
<th>Five years following project 2010 to 2015 (US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated on-farm investment under baseline</td>
<td>14.8</td>
<td>19.6</td>
</tr>
<tr>
<td>Estimated on-farm investment under project scenario</td>
<td>33.3</td>
<td>62.0</td>
</tr>
<tr>
<td>On-farm investment project scenario - project areas</td>
<td>6.4</td>
<td>4.8</td>
</tr>
<tr>
<td>On-farm investment project scenario - out of project areas</td>
<td>26.9</td>
<td>57.2</td>
</tr>
<tr>
<td>Total on-farm incremental investment</td>
<td>18.5</td>
<td>42.4</td>
</tr>
<tr>
<td>Total to be financed by project</td>
<td>12.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Leveraged Investment</td>
<td>6.0</td>
<td>42.4</td>
</tr>
<tr>
<td>Total Leverage Investment to 2015</td>
<td></td>
<td>48.4</td>
</tr>
</tbody>
</table>
The project’s impact on pollution of the international waters of the South China Sea would be substantial. Current levels of pollution would first be reduced within the project areas and then more widely through replication of technologies demonstrated under Component 1 and promoted under the project’s policy and capacity building activities. Equally important would be the project’s preventive impact, by assisting the countries to shift their focus from a ‘cure of symptoms’ approach towards planning and directing future development of livestock production with environmental considerations.

5. **Scope of the Analysis**

The analysis estimates baseline and GEF Alternative costs of investment in prevention or mitigation of nutrient fluxes from livestock waste entering domestic waterways and the South China Sea and current farm-level investment on livestock waste management with and without the project. These estimates are at the national level in Thailand and Vietnam and at the provincial level (Guangdong) in China.

To reach the level of investment necessary to meet the global environmental objective, significant additional domestic benefits would be created. These additional domestic benefits comprise of cleaner water in rivers and streams, reduced eutrophication of inland water bodies and reduced nitrate content in ground water. These benefits are not currently targeted in domestic or national programs. Thus they are not national priorities and fall into the category of ‘concurrent domestic benefits’.

6. **Incremental Costs**

The analysis takes into account private and public investment in improved livestock waste management practices as well as direct investment related to policy, training, capacity building, and enforcement involved in moving from the baseline scenario to the GEF Alternative. The total baseline investment of US$14.8 million is determined by baseline spending on farm-level livestock waste management systems and is assumed to include government subsidies to on-farm investment. The baseline scenario will not involve significant direct investments in policy development, monitoring and evaluation, or regional coordination and thus baseline costs under Components 2, 3, and 4 are considered to be zero. The GEF Alternative, totaling US$44.8 million, shows costs of moving from the current approach to an integrated approach that will allow livestock waste management practices to be improved to a higher level to meet the global environmental objective. Table 2 shows the incremental cost by project component. The incremental cost of moving from the baseline scenario to the GEF Alternative was estimated at US$30.0 million, of which US$24 million would be financed by the project by the GEF and cost-sharing arrangements between national governments, the private sector, and FAO. The remaining US$6.0 million are expected to be investment in improved livestock waste management by farmers not involved in the project.

**Table 2. Incremental Cost Matrix (US$ million)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Category</th>
<th>Cost</th>
<th>Local Benefits</th>
<th>Global Benefits</th>
</tr>
</thead>
</table>

3 Indicating the cost under subcomponent Technology Demonstration of Component 1 which finances on-farm investments in improved and innovative technologies and is included in on-farm investment estimates.
<table>
<thead>
<tr>
<th>1. LWM Technology Demonstration</th>
<th>Baseline</th>
<th>14.8</th>
<th>Improved sustainability of intensive pig production through adoption of proven manure storage, treatment and recycling technologies. Reduction in local environmental hazards and nuisance factors.</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEF Alternative</td>
<td></td>
<td>34.4</td>
<td>Increased on-farm investment in livestock waste management, leading to improved nutrient balances and quality of domestic waterways, as well as public health benefits. Increased availability and knowledge of innovative technologies for mitigating environmental impact of intensive livestock waste and private and public capacity to implement such technologies.</td>
<td>N/A</td>
</tr>
<tr>
<td>Increment</td>
<td>19.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Policy and Regulatory Development</td>
<td>Baseline</td>
<td>0.0</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GEF Alternative</td>
<td></td>
<td>4.8</td>
<td>Development and adoption of integrated policies and standards for improving the management of livestock waste and its discharge into the environment; increased public and producer awareness; improved capacity for training and enforcing policies</td>
<td>N/A</td>
</tr>
<tr>
<td>Increment</td>
<td>4.8</td>
<td></td>
<td>Wider replication of improved LWM practices throughout the project area, leading to enhanced long-term sustainability of pig production surrounding the South China Sea</td>
<td></td>
</tr>
<tr>
<td>3. Project Management and Monitoring</td>
<td>Baseline</td>
<td>0.0</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GEF Alternative</td>
<td></td>
<td>4.1</td>
<td>Better information on the impact of livestock waste management through regularized monitoring. Improved institutional capabilities for supporting livestock waste management.</td>
<td>N/A</td>
</tr>
<tr>
<td>Increment</td>
<td>4.1</td>
<td></td>
<td>Monitoring of progress towards achievement of project’s global environmental objective and increased regional knowledge sharing of project impacts.</td>
<td></td>
</tr>
<tr>
<td>4. Regional Support Services</td>
<td>Baseline</td>
<td>0.0</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GEF Alternative</td>
<td></td>
<td>1.5</td>
<td>National agencies for livestock are better able to regulate, support and monitor a more environmentally-sustainable intensive livestock production industry meeting national economic and environmental needs.</td>
<td>N/A</td>
</tr>
<tr>
<td>Increment</td>
<td>1.5</td>
<td></td>
<td>Countries bordering the SCS apply common tools, guidelines and standards for LWM, resulting in much better coordination and effectiveness at regional level of their efforts to reduce pollution of international waters of the SCS caused by intensive livestock production.</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Baseline</td>
<td>14.8</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GEF Alternative</td>
<td></td>
<td>44.8</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Increment</td>
<td>30.0</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
ANNEX B: PROJECT LOGICAL FRAMEWORK

Results Framework

<table>
<thead>
<tr>
<th>PDO</th>
<th>Outcome Indicators</th>
<th>Use of Outcome Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDO: reduce the major negative environmental and health impacts of rapidly increasing concentrated livestock production on the open waters of and thus on the people of south-east Asia. Global environment objective: To reduce land-based pollution and environmental degradation of the South China Sea and Gulf of Thailand.</td>
<td>Process Indicators % of all intensive livestock farmers implementing improved (level 1 and level 2) livestock waste management practices Improved spatial distribution planning for livestock production Stress Reduction Indicator Reduced livestock production related emissions of pollutants (N, P, BOD, COD and E. Coli) in surface water systems of project areas</td>
<td>YR1-YR2 gauge project progress. YR3s determine if implementation strategy needs to be changed. YR5 feed into evaluation and strategy for mainstreaming program.</td>
</tr>
</tbody>
</table>

### Intermediate Results

<table>
<thead>
<tr>
<th>Outcome Indicators for Each Component</th>
<th>Use of Results Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome 1: Cost-effective livestock waste management technologies for intensive livestock production demonstrated.</td>
<td>Outcome 1: This information, collected through project monitoring as well as regular agricultural surveys, indicates whether the project is on track for meeting its goals of demonstrating improved LWM approaches and thus for achieving its PDO. Necessary information to determine whether the project’s capacity building activities are sufficient to permit achievement of the project’s broader objectives.</td>
</tr>
<tr>
<td>Outcome 2: Governments and local communities to encourage and regulate livestock farmers to implement better manure management practices</td>
<td>Outcome 2: This information will provide feedback on whether a voluntary or compulsory approach is more effective in obtaining desired changes in behavior by intensive livestock producers. Decisions can be made regarding the most effective media to employ and audiences to target about LWM issues.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of Results Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome 1: This information, collected through project monitoring as well as regular agricultural surveys, indicates whether the project is on track for meeting its goals of demonstrating improved LWM approaches and thus for achieving its PDO. Necessary information to determine whether the project’s capacity building activities are sufficient to permit achievement of the project’s broader objectives.</td>
</tr>
<tr>
<td>Outcome 2: This information will provide feedback on whether a voluntary or compulsory approach is more effective in obtaining desired changes in behavior by intensive livestock producers. Decisions can be made regarding the most effective media to employ and audiences to target about LWM issues.</td>
</tr>
</tbody>
</table>
| % of individuals in local communities and decision makers aware of LWM issues and willing to reduce environmental impacts from livestock production.  
| Increased attention to livestock waste management issues in local and national government and donor policy documents.  
| **Outcome 3:**  
| Overall institutional capacity for project implementation improved.  
| **Outcome 3:**  
| Process Indicators  
| Number of project staff trained, number of workshop and study tours carried out and master plan for capacity building prepared.  
| M&E system in place and periodic evaluations of project outputs and impacts carried out.  
| Stress Reduction Indicator  
| Reduced human health risk as a result of minimized potential transmission of pathogens, antibiotics and their resistance strains from livestock to human being.  
| **Outcome 3:**  
| Review adequacy and appropriateness of institutional setup, provide technical assistance if necessary  
| Up to three internal evaluations of the project’s progress towards achievement of the PDO/GEO are envisaged, in PY 1, 3 and 5 (it may be decided to dispense with the first review). Besides normal project supervisions, these evaluations, covering each of the three countries, will be the most important guide to the need for mid-term review.  
| **Outcome 4:**  
| Vietnam, Thailand and Guangdong province of China leading among countries bordering the South China for the use of common tools, and guidelines to address manure management issues.  
| **Outcome 4:**  
| Process Indicators  
| Decision tools, guidelines and training packages produced and trainers trained in Vietnam, Thailand and Guangdong province (no. of DST and related training packages).  
| Networks of government staff, scientists and farmers are operative in Vietnam, Thailand and Guangdong province of China and neighboring countries.  
| Reference data bases and studies in the thematic areas of the project are made available.  
| **Outcome 4:**  
| Adapt decision support tools developments to local requirements.  
| Evaluate potential for harmonized LWM approaches across the countries bordering the South China Sea.  
| Expressed demand by neighboring countries for dissemination and replication.  

## Arrangements for Results Monitoring

### Target Values

<table>
<thead>
<tr>
<th>Outcome Indicators</th>
<th>Baseline</th>
<th>YR1</th>
<th>YR2</th>
<th>YR3</th>
<th>YR4</th>
<th>YR5</th>
<th>Frequency and Reports</th>
<th>Responsibility for Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of intensive livestock farmers implementing improved (level 1 and level 2) livestock waste management practices</td>
<td>Thailand 25%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>40%</td>
<td>Yearly cumulative report</td>
<td>Env. agency</td>
</tr>
<tr>
<td></td>
<td>Vietnam 35%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50%</td>
<td>Yearly cumulative report</td>
<td>Env. agency</td>
</tr>
<tr>
<td></td>
<td>Guangdong 35%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50%</td>
<td>Yearly cumulative report</td>
<td>Env. agency</td>
</tr>
<tr>
<td>Improved spatial distribution planning for livestock production</td>
<td>Monitoring</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Yearly cumulative report</td>
<td>PMO</td>
</tr>
<tr>
<td>Reduced livestock production related emissions of pollutants (N, P, BOD, COD and E. Coli) in surface water systems of project areas</td>
<td>Monitoring</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Yearly cumulative report</td>
<td>Env. agency</td>
</tr>
</tbody>
</table>

### Results Indicators for Each Component

#### Component One:

- **Improved LWM practices manuals (Level 2) developed for main pig farming systems of Thailand, Vietnam and Guangdong province.**
  - None - Completed - Completed - Completed - Completed
  - Yearly report
  - Responsibility: PMO, RFO

- **Requests for project intervention received from farmers and local communities outside the demonstration areas (number).**
  - None - 10 - 50 - 100 - 500
  - On-going tracking by project management office
  - Responsibility: PMO

- **Reduction in nitrate, phosphates and BOD, COD and E. Coli discharge at (a) the end of the pipe of the individual farms or community; and (b) at critical downstream locations.**
  - To be undertaken YR1 - 20% - 40% - 70% - 90%
  - Yearly cumulative report
  - Responsibility: Environment, agency and livestock development agency

- **Number of SPP covered by farms adopting Level 2 LWM systems with project support. (head '000).**
  - Thailand 0 - Vietnam 0 - Guangdong 0 - 260 - 145 - 125
  - Yearly cumulative report
  - Responsibility: Records of PMO

#### Component Two:

- **Number of provinces (Thailand and Vietnam) and counties (Guangdong) where policies and regulations for LWM developed and introduced**
  - 0 - 3 - 6 - 6 - 9 - 9
  - Yearly cumulative report
  - Responsibility: PMO

- **Number of sub-districts (Thailand),**
  - 0 - 0 - 6 - 12 - 18 - 27
  - Yearly cumulative report
  - Responsibility: PMO
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Methods</th>
<th>Follow-up</th>
<th>Evaluation</th>
<th>Reports</th>
<th>Responsible Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component One:</strong></td>
<td>% of individuals in local communities and decision makers aware of LWM issues and willing to reduce environmental impacts from livestock production.</td>
<td>To be undertaken YR1</td>
<td>LC40% DM70%</td>
<td>Beginning and end of project – comparative report</td>
<td>Media survey</td>
<td>Env. agency</td>
</tr>
<tr>
<td><strong>Component Two:</strong></td>
<td>Increased attention to livestock waste management issues in local and national government and donor policy documents.</td>
<td>Monitoring</td>
<td></td>
<td>Yearly cumulative report</td>
<td>Progress report</td>
<td>PMO</td>
</tr>
<tr>
<td><strong>Component Three:</strong></td>
<td>Number of project staff trained, number of workshop and study tours carried out and master plan for capacity building prepared.</td>
<td>None</td>
<td>based on master plan</td>
<td>based on master plan</td>
<td>based on master plan</td>
<td>Semi-annual report</td>
</tr>
<tr>
<td></td>
<td>M&amp;E system in place and periodic evaluations of project outputs and impacts carried out.</td>
<td>None</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Reduced human health risk as a result of minimized potential transmission of pathogens, antibiotics and their resistance strains from livestock to human being.</td>
<td>To be undertaken YR1</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td><strong>Component Four:</strong></td>
<td>Decision tools, guidelines and training packages produced and trainers trained in Vietnam, Thailand and Guangdong province (no. of DST and related training packages)</td>
<td>None</td>
<td>-</td>
<td>2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Networks of government staff, scientists and farmers established and operative in Vietnam, Thailand, China and neighboring countries.</td>
<td>Monitoring</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Requests for project support for training and extension programs received from other countries (provinces).</td>
<td>None</td>
<td>-</td>
<td>3</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>
ANNEX C: RESPONSE TO PROJECT REVIEWS

A) CONVENTION SECRETARIAT COMMENTS AND IA/EXA RESPONSE

Not Applicable.

B) STAP EXPERT REVIEW AND IA/EXA RESPONSE

1. **Appropriateness of approaches to collect and integrate relevant information.** The reviewer believes that this project appears to be a sound project and that a thorough analysis of Social Safeguard Policy Issues is given in the document. However, he comments that attributing environmental outcomes, such as water quality improvement, to Project activities will be very difficult within the 5-year period of this project and suggests that the project should be very careful in promising that collected water quality data will provide definitive indicators of Project impact.

**Response:** The Task Team agrees on the suggestion and will revise the relevant attributes.

2. **The inter-linkages between water-related environmental issues and root causes.** The review has no doubt that manure mismanagement can impair water quality. However, he stressed that the root causes of manure mismanagement, such as lack of labor, land areas for manure spreading, and availability of preventative technologies that impact farmer behavior are less well understood. He points out that these factors are not very well explored in the document.

**Response:** The Task Team agrees to further explore and fully document these root causes in the project’s final documentation.

3. **Environmental sampling.** The review mentions that environmental sampling needs to be better thought out in terms of what to measure where, when, and how often to have the highest probability of associating measured water quality improvement to changes in farmer behavior (simple modifications of current practices, such as feed, manure handling, storage, land application, marketing strategies).

**Response:** The Task Team agrees with the reviewer’s view. The environmental sampling has been discussed with each country team during the project preparation and the details will be included in the M&E plan to be finalized by each participating country at project appraisal.

4. **Tools and methodologies for TDA and SAP.** The Trans-boundary Diagnostics Analysis (TDA) and Strategic Action Plans (SAP) were not found in the document.

**Response:** Both Trans-boundary Diagnostics Analysis and Strategic Action Plans are being prepared by the UNEP/GEF South China Sea and Gulf of Thailand Large Marine Ecosystem Project. Its Pollution Reduction Committee was briefed on and strongly supports this project.

5. **Technologies adequate and adapted to the regional socio-economic profile.** The reviewer notes that the document provides useful information on the diversity of the production systems across the Project’s target region but comments that this information could have been used more fully to select sites for the initial demonstration farms.
Response: The Task Team appreciates the review’s comment and agrees to use more explicitly the information specifically the diversity of the production systems in selection of demonstration farms during later years’ project implementation. The Task Team would like also to explain that the initial demonstration farms are selected based on a three-step selection criteria agreed with the World Bank, which may be updated periodically during project implementation as needed and included in the Project Implementation Plan of each participating country.

6. **Impact on the poor.** The reviewer points out that current trends point towards a concentration of livestock, apparently with a pretty grim outlook for the poor. There needs to be a more clear rationale for selection of production systems and their impact on the poor, who likely require very different waste management approaches, than the lagoons, pipes, digesters promoted for small and medium size operations. The project may wish to consider total funding the remedial and or preventative measures needed for farms of the poor within critical pollution source areas.

Response: Total funding by the project for poor farms within critical pollution source areas has been discussed intensively during project preparation and was rejected due to sustainability and replicability concerns. Besides, internalizing the environmental externalities would “level the playing field” and boost smallholder’s comparative advantages. The Task Team however agrees to take a more pro-poor farm approach in selection of demonstration farms for implementation in year 2 and beyond.

7. **Do the proposed technologies pose environmental threats?** The reviewer urges the project to pay particular attention to monitoring the design, construction, and perhaps most importantly, the maintenance of manure storage structures and makes a specific proposal to draw up strict guidelines for contractors to follow in terms of construction specifications, contingency plans for storage overflows, breaches, etc.

Response: The Task Team agrees with the reviewer’s proposal to ensure that such guidelines are in place prior to actual construction of any manure treatment facilities.

8. **Role of research and local institutions.** The reviewer comments that the role of research (e.g. Universities, National Research Institutes) and local (farmer) institutions has not been articulated in the Project Appraisal Document.

Response: The national research and local institutions are expected to play an important role in the project e.g. in the areas of training and extension. The Task Team agrees to illustrate their defined roles more explicitly in final project documents.

9. **Cross-representatives of demonstration sites.** While noting that initial demonstration sites will be located in areas of each country where farmers and their communities have identified water quality problems associated with animal agriculture, the reviewer comments that the cross-representatives of these sites in terms of weather, soils, runoff potential conditions were not clearly stated.

Response: The cross-representativeness of these selected initial demonstration areas in terms of weather, soils, runoff potential conditions and a full range of other data has been reviewed and confirmed during farm selection process. The Task Team will ensure that the requested site specific information and data will be presented in a project implementation report required from each farm and village. In addition, the
demonstration areas to be selected at project Year 2 and beyond will complement the areas selected for project Year 1 to ensure the overall representativeness of the demonstration areas.

10. **M&E efforts to ascertain the representativeness.** The reviewer stresses that to have the desired outcomes, the Project’s monitoring and evaluation efforts should continue to ascertain the representativeness of selected geographic areas and types of production systems.

**Response:** The Task Team agrees.

11. **Collaboration.** The reviewer suggests the project to form strong collaboration with animal nutritionists, and perhaps most importantly, the feed industries, or those who formulate, produce and supply pig rations to farmers in order to significantly reduce nutrient loads in manure, land requirements to recycle manure nutrients, nutrient buildup in soils and decrease nutrient loads in runoff.

**Response:** The Task Team agrees.

12. **Livestock production issues.** The reviewer believes that the projected increase in industrial animal production will lead to concentrations of manure and dead animals. He suggests that dealing with the latter needs to be considered and also, the project may wish to consider action plans for emergencies associated with Project-funded technologies, such as leaks in manure storage structures, structure breaches, and manure spills.

**Response:** These issues have been discussed during project preparation and specific actions are under development which will be included in Project Implementation Plans. The Task Team will ensure that the major livestock production issues including those raised by the reviewer will be dealt with appropriately.

13. **Additional technical aspects.** The reviewer lists the following additional technical aspects related to manure storage design and use that were not explicitly addressed in the document: (1) roofing over manure storages (2) storage capacity, or how many days storage is required; (3) are storage structures suppose to be emptied monthly, quarterly, annually; (4) will the required periodic, timely emptying of storage cause labor problems?

**Response:** The Task Team recognizes the importance of these technical aspects for a successful design, construction and use of manure storage and will ensure the inclusion of these technical aspects.

14. **Focus on measurable short-term indicators.** The reviewer emphasizes that the project will need to focus on realistic, shorter-term outcomes that can be measured within the 5-year period and link these to longer-term environmental impact. He lists specific changes for the project to consider. The reviewer also stresses that more modest and perhaps more measurable shorter-term “proxy” indicators of environmental change should be considered.

**Response:** The Task Team agrees to the approach emphasized by the reviewer to focus on measurable short-term indicators and will make specific revisions in the project documents accordingly.
15. **Targeted production systems and technologies.** The reviewer is unclear about a number of aspects related to targeted production systems and technologies (Annex 9, Table 2) such as how prominent are the described systems (in terms of relative farm and animal numbers; and have these technologies been tested and proven successful under local conditions).

**Response:** The Task Team agrees to clarify these aspects and revise the project documents accordingly.

16. **Involvement of stakeholders in the project.** The reviewer is less clear about the abilities of national institutions as none appear to have distinct mandates for abating pollution from animal wastes. There is no presentation or discussion related to local institutions, such as farmer co-ops, and their possible roles in attaining project objectives.

**Response:** In each participating country, ministries with mandates for environmental protection and livestock production at the national level and their extensions at local levels are the key institutions responsible for project preparation and implementation. A variety of stakeholders including farmer groups is expected to be involved in project. The project would establish stakeholder participation and consultation mechanisms tailored to facilitate the stakeholder participation especially private sector. The Task Team agrees to ensure that these will be adequately presented in final project documents.

17. **Terminology for “waste”**. The reviewer hopes that the Project may wish to consider an alternative to “waste” terminology to reflect the manure as a valuable source of fertilizer, feed, and energy.

**Response:** The Task Team realizes the limit of livestock “waste” terminology and agrees to use alternatives wherever appropriate such as in developing training materials. However, the project name will remain unchanged to avoid procedural confusion.

18. **Involvement of supply dealers in policy development.** The reviewer reminds the project to explore ways to bring input supply dealers, such as representatives of the feed and fertilizer industries, into policy development.

**Response:** The Task Team agrees to involve supply dealers in policy development. Specific mechanism will be discussed and sought out with each country team.

19. **Marginal value of manure nutrients.** The reviewer comments that in Annex 9, it was not clear where the 65-95% of fresh pig manure nutrients safely removed would go. If fertilizer savings, biogas, inputs into fish production have not been included in the marginal costs analyses (Table 4) then what is the basis for the differences between the costs of removing, for example 1 ton of nitrogen with ($1,291) and without ($2,564) recycling technologies?

**Response:** All the treatment methods considered are proven to be effective in removing around 90% nutrients in the environment. The potential benefits are similar and netted out so as to allow for analysis of the marginal costs of nutrient removal. The Task Team agrees to clarify the assumptions used in the cost effectiveness analysis and has revised the presentation accordingly.
20. **Regional pollution standards.** The reviewer suggests that the project may wish to urge the development of waste management/emission standards that each of the three countries must meet.

**Response:** This option was intensively discussed with the participating countries during project preparation. The countries however raised their concerns about a too integrative approach. It was therefore decided to develop common decision support tools and training programs rather than regional environment standards under this project.

C) GEF SECRETARIAT AND OTHER AGENCIES’ COMMENTS AND IA/EXA RESPONSE

(1). **At Pipeline Entry**

21. **Feasibility of developing a larger implementation framework, a type of Partnership for implementation of pollution reduction measures, would be explored during project preparation.**

**Response:** The GEF and the World Bank have agreed to develop a Strategic Partnership for a Land-Based Pollution Reduction Investment Fund for the Large Marine Ecosystems of East Asia, of which this project is one component and the first joint initiative to address the key issue of agricultural pollution. A project concept for this partnership entered the GEF pipeline in March 2004 and PDF Bs to prepare its Revolving Fund and several of its other investment components have been approved by the GEF.

22. **Project design will be fully developed, and a stronger rationale for a regional approach will be provided.**

**Response:** Joint efforts have been made by the participating countries and FAO/LEAD (the implementing agency of PDF-B grant) to fully design the project (as evidenced by this proposal) and to justify a regional approach. The rationale for the regional approach is strong and is specifically to ensure that (i) the region’s three most important countries, in terms of livestock production and waste pollution, are involved; (ii) their common interest in protecting ecosystems of the South China Sea is emphasized; (iii) important cross-country synergies are promoted; and (iv) experience from the project demonstration is replicated throughout the East Asia region. The politically, socially, technically, geographically, and economically workable solutions to protect the environment under tremendously different situations and conditions can clearly be most effectively be developed and demonstrated through a regional approach that addresses a wide range of differing local circumstances.

23. **A detailed replication strategy, including activities and resources, will be developed.**

**Response:** The project has been designed to maximize the potential for replication beyond its immediate impact area. Project replicability has accorded strong attention of the governments of all participating countries. Replication is also one of the key elements under component 4. A replication strategy has been discussed very seriously with each participating country during project preparation. All countries have recognized the urgent need for an overall livestock waste management strategy resulting from increasing pressure locally, nationally and internationally. The replication strategy thus has been regarded by the participating countries as an integral part of and excellent vehicle for the
governments’ overall livestock waste management strategy. To maximize the impact of this replication strategy, the task team agreed to the following approach that each participating country will (i) develop a draft replication strategy by project appraisal, (ii) incorporate inputs from other key government agencies and institutions within each country involved in livestock waste management by project effectiveness, (iii) revise and update the replication strategy during project implementation, (iv) eventually integrate the replication strategy into each country’s overall livestock waste management strategy.

24. **The section of stakeholder involvement, a key aspect, is to be developed.**

**Response:** All the key stakeholders are involved in project preparation and will be involved in project implementation. The proposed project has already won strong support from individual farmer households, NGOs and government authorities at national, provincial and local levels, which jointly are guiding the project preparation. A stakeholder participation plan is under preparation by each participating country which would detail out participation and consultation mechanisms tailored to facilitate the participation of all the stakeholders, especially the private sector. These plans will be reviewed by the Bank’s appraisal mission. Stakeholder participation is summarized in the Stakeholder Involvement section [3(d)] of this document and discussed in more detail in annex 10 of the Project Brief.

25. **M&E plan, a key aspect, is to be fully developed.**

**Response:** An M&E Plan has been prepared by each participating country and included in country specific Project Implementation Plans. These M&E plans are still in draft form and have been reviewed by the Bank with detailed comments and recommendations which will be finalized at project appraisal. A Bank consultant visited all three countries from January 25 to February 5, 2005 to further assess the adequacy of these plans and make recommendations for improvement. The task team will make sure that relevant process indicators, stress reduction indicators and environmental status indicators will be established and included in the finalized M&E Plans.

26. **Coordination among projects and partners should be translated into specific activities preparation, including a possible coordination component with foundational projects currently underway, perhaps part of a partnership arrangement.**

**Response:** Coordination among related projects and concerned partners has been one of the key considerations of the task team during project preparation. Within the technical context of the project itself, coordination during project preparation was done through office visits, e-mail communication and project-specific web-site surf to learn related project experience and progress, exchange views on project design, coordinate project activities and geographic coverage. The project’s design benefited greatly from this coordination, and has incorporated experience and lessons learned from many related projects and programs already existing or underway in the countries around the South China Sea. A mechanism for coordination with related activities during project implementation has been built into the project, largely under the regional support services component. Specific coordination activities will include (i) exchange of experience and results through study tours and workshops, (ii) development of an internet portal on “livestock waste management in East Asia”, and (iii) publications. The routine
coordination will be ensured through a Regional Facilitation Office located in FAO’s regional hub in Bangkok.

The project concept has been shared with and endorsed by the two related GEF large marine ecosystem management projects that are currently under implementation in the region – the UNEP/GEF South China Sea/Gulf of Thailand Project and the UNDP/IMO/GEF PEMSEA Project and a coordination mechanism with the more relevant UNEP project has been established. It is an integral component of the emerging GEF/World Bank Strategic Partnership for a Land-Based Pollution Reduction Investment Fund for the Large Marine Ecosystems of East Asia, and its activities, interim and final results will be disseminated amongst the stakeholders in this Partnership.

(2). At Work Program Submission

27. The focus of the project has shifted from demonstrating on the ground ways to address the regionally critical issue of industrial livestock production (with huge concentrations of manure and dead animals) to building the capacity of farmers in manure management.

Response: The focus of the project remains unchanged with 77% of total project cost budgeted for demonstration of livestock waste management and policy development activities. This has been emphasized throughout the project preparation and reflected in project documents (the Project Brief, mission Aide Memoire). It is true that the task team has given increasing importance to and remains committed to capacity building in response to one of the key recommendations made by the Bank’s Project Preparation Review panel (September 9, 2004) and the participating countries’ strong request. As a result, a detailed master capacity building development plan is under preparation by each country which will be reviewed by the appraisal mission. However, the budget for capacity building has been kept unchanged in terms of relative percentage to the total project budget and even reduced in absolute dollar term from the budget allocation at project pipeline entry. Of this, capacity building for farmers is about US$0.5 million. To mitigate the gap in financing the capacity building activities, various sources are under exploration including PHRD grant. The task team has revised project documents to avoid potential confusions.

28. Consequently, the role of the private sector has been greatly reduced, including the expected co-financing.

Response: The proposed project has won strong support from many intensive livestock producers, farmer groups and NGOs and the private sector has played a key role in project development, including designing, preparation and the selection of the first group of demonstration farms and villages in all three participating countries. To ensure its ownership and continuous role, the private sector will be responsible for implementation of all the technology demonstrations on the selected farms and villages. The lower confirmed co-financing by the private sector, compared to the projections made at the time of pipeline entry resulted from (i) a reluctance on the part of some private sector producers to commit financial contributions at the project preparation stage and (ii) a decision by two major private livestock production companies, Charoen Pokhand Food Public Co., Ltd. and Betrago Group (the two largest livestock producers in the region) to participate in the project not to formally commit co-financing at this time.
Nevertheless, the private sector contribution under this project has a higher contribution rate than some other GEF funded projects with similar component for nutrient reduction. The following table shows a comparison. The task team will take steps during appraisal and project implementation to engage the private sector fully in the project to catalyze more investment from private sector and ensure the private sector’s strong role.

<table>
<thead>
<tr>
<th>Project</th>
<th>Nutrient Reduction Component (US$ million)</th>
<th>Private Sector Funding (US$ million)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock Waste Management in East Asia</td>
<td>12.50</td>
<td>6.25</td>
<td>50.0%</td>
</tr>
<tr>
<td>Poland Rural Environmental Protection</td>
<td>13.80</td>
<td>4.00</td>
<td>29.0%</td>
</tr>
<tr>
<td>Serbia Danube River Enterprise Pollution Reduction</td>
<td>18.80</td>
<td>9.34</td>
<td>49.7%</td>
</tr>
</tbody>
</table>

29. **As recommended in this review, a Strategic Partnership for Pollution Reduction in East Asian Seas is now under preparation. The proposal, while acknowledging the existence of this initiative, does not indicate in any way substantive links with the Partnership. The proposed projects cannot be considered an "example" of projects to be funded under the Partnership, since the focus of the Partnership will not be on capacity building to address diffuse pollution from agricultural activities, including farm level manure management, but on investments and reforms dealing with, in the case of livestock, industrial concentrations.**

**Response**: The task team has added a paragraph to the Section 3a that explains how the project links to the Partnership.

30. **The proposed activities seem to fall essentially under FAO – LEAD regular mandate and programs.**

**Response**: The project is designed to achieve the project’s and GEF’s global objectives and reflected the participating countries’ priorities. The inclusion of a regional support services component to be facilitated by FAO/LEAD is necessary to ensure that (i) the region’s three most important countries, in terms of livestock production and waste pollution, are involved; (ii) their common interest in protecting ecosystems of the South China Sea is emphasized; (iii) important cross-country synergies are promoted; and (iv) experience from the project demonstration is replicated throughout the East Asia region. FAO/LEAD’s main mandate is to initiate activities linked to livestock and the environment interaction and its overall resources are limited. While the project has a much broader scope of activities, FAO/LEAD is expected to play a limited role during project implementation i.e. providing regional support services.

31. **Should the proponent wish to further pursue an initiative dealing with pollution from industrial concentrations of livestock within the context of the Partnership presently under preparation, the project should be of an on the ground demonstration nature and deal with industrial livestock production and private sector involvement, as originally proposed.**

**Response**: The task team agreed with this suggestion and has revised the Executive Summary and the Project Brief to respond to GEFSec comments and address other concerns raised at the bilateral discussion with GEFSec on February 7, 2005 to clarify the project to be of an on the ground demonstration nature and deal with industrial livestock production and private sector involvement.