External Evaluation
Final Report

FAO Project GCP/PHI/050/ITA

Environmental Animal Health to Redress Emerging Insect-borne and Other Disease Constraints to Smallholders' Livestock Production

"The Environmental Animal Health Management Initiative (EAHMI)"

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Abbreviations

ACIAR	Australian Centre for International Agricultural Research
AFMA	Agriculture and Fisheries Modernisation Act
AHDV	animal health diseases vulnerability
APHCA	Animal Production and Health Commission for Asia and the Pacific
BAI	Bureau of Animal Industry
CIP	comparative index of poverty
CLSU	Central Luzon State University
CTA	Chief Technical Adviser
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DPWH	Department of Public Works and Highway
EAH	Environmental Animal Health
EAHM	Environmental Animal Health Management
EAHMI	Environmental Animal Health Management Initiative
EE	external evaluation
ERGO	Environmental Research Group Oxford
ESRI	Environmental Systems Research Institute, Inc.
FAO	Food and Agriculture Organisation
FAOR	FAO Representative
FMD	foot and mouth disease
GIS	geographic information system
GoI	Government of Italy
GoP	Government of the Philippines
HPAI	highly pathogenic avian influenza
ICTU	Information and Communication Technology Unit
IPM	integrated pest management
IRP	indicators of rural poverty
IT	information technology
ITCAF	Information Technology Centre for Agriculture and Fisheries
LDC	Livestock Development Council
LGU	local government unit
LoA	letter of agreement
LogFrame	logical framework

MDG	Millennium Development Goal
MTPDP	Medium-Term Philippines Development Plan
MUSCA	Mindanao Unified Surra Control Approach
NAMRIA	National Mapping and Resource Information Authority
NDA	National Dairy Authority
NEDA	National Economic Development Authority
NIN	National Information Network
NSO	National Statistical Office
NTE	not to exceed date
OIE	World Organisation for Animal Health, *Organisation Mondiale de la Santé Animale* (formerly *Organisation Internationale des Epizooties*)
PAHC	Philippines Animal Health Centre
PBEE	FAO Evaluation Service
PCARRD	Philippine Council for Agriculture, Forestry and Natural Resource Research and Development
PCC	Philippine *Carabao* Centre
PIDS	Philippine Institute of Development Studies
PNP	Philippines National Police
ProDoc	Project Document
PVMA	Philippine Veterinary Medical Association
PVO	Provincial Veterinary Office
RFU	regional field unit
RS	remote sensing
SARD	sustainable agricultural and rural development
SARS	severe acute respiratory syndrome
SC	Steering Committee
SESAM	School of Environmental Science and Management
SPCMAD	Special Coordination and Monitoring and Assistance Division
TNA	training needs assessment
TREES	(Training Centre for) Tropical Resources and Ecosystems Sustainability
UN	United Nations
UPLB	University of the Philippines, Los Baños

1 Executive Summary

This report presents the findings of the external evaluation of FAO project GCP/PHI/050/ITA, titled *Environmental Animal Health to Redress Emerging Insect-borne and Other Disease Constraints to Smallholders' Livestock Production*. The project is widely known as the 'Environmental Animal Health Initiative' (EAHMI). The project started in September 2005 with a planned duration of three years. However, recruitment of key project team members delayed the actual start of implementation giving the project an effective life of nearer two years at the time of the external evaluation mission's field work in April, 2008. The end date (NTE) of the project is 31-Aug-08. Thus, the evaluation took place towards the end of the project.

The mission was timed so that it could assess results and make recommendations regarding potential continuation and expansion of EAHMI. Its timing was influenced also by a Tripartite Review mission, which took place in November 2007 and had recommended possible continuation of the project. The donor, the Government of Italy, was receptive to this possibility: the mission found this to be the case in the Philippines and was informed that it was also the case in Rome, but was told that it had been agreed that an external evaluation (which was foreseen in the Project Document) should be conducted before decisions were made on future funding of the project.

In accordance with the new FAO evaluation policy, the mission's team members were technical specialists chosen for their professional backgrounds, rather than as representatives of the donor, the recipient government and FAO in a tripartite evaluation team. The three-member team for this mission consisted of an animal health specialist, an institution and capacity-building specialist and a GIS and remote-sensing specialist.

The purpose of the project is to contribute towards sustainable agricultural development (SARD) through environmental animal health management (EAHM). To achieve its Development Goal of SARD, the project was designed with three Immediate Objectives:

1. To strengthen institutional capacity for EAHM at national and Regional Field Unit (RFU) and Local Government Unit levels.
2. To formulate EAHM strategies for enhanced smallholder production.
3. To promote the integration of EAHM principles in national livestock development and disease control policy and planning.

The project entails development of an innovative approach to animal health management, utilising GIS technology. From acquisition and analysis of geo-referenced data, through geo-spatial analysis, output maps can be generated as a powerful tool for use by decision makers in the field of animal health. Depending on the input data, there is potential to analyse covariance of livestock production, agricultural and environmental factors, human activities and poverty and display the results on maps.

The project's administration is situated within the Bureau of Animal Industry in the Department of Agriculture (DA), Manila where it is managed by a small team (see

section 5.4). The project has formally agreed partners: DA RFUs III and IV, the Provincial Veterinary Officers of Laguna Province and Nueva Ecija Province, the Philippine *Carabao* Centre, the Mindanao Unified Surra Control Approach Programme and the National Dairy Authority. The project collaborated with several university departments through, for example, sub-contracted commissioned studies.

Regarding the design of the project, the External Evaluation (EE) found that the project was relevant to UN Millennium Development Goals (section 4.1.1), to the priorities of the Government of Italy Cooperative Programme (4.1.2) and to the Government of the Philippines development plans (4.1.3). In terms of the project's rationale, the EE found that the project was well justified in the context of rural development in the Philippines (4.1.5) and that the Project Document clearly and systematically described the main needs to be addressed by the project. The project's immediate objectives are logically linked (4.2) and the Logical Framework is well specified (4.3.2). However, deeper analysis at the design stage should have more clearly specified the project's beneficiaries (4.3.1).

The concept of the project timeframe was for three sequential phases (one for each of the immediate objectives) corresponding to the three implementation years. The EE considered this concept to be a mechanistic simplification (4.3.3). Despite the planned duration, the design acknowledged the prospect of further inputs being required and, thus, this project was perceived from the beginning as a first phase.

The EE found that the Project Document lacked precision regarding the expected numbers of trainees, although national staff to be trained are the immediate beneficiaries (4.3.4). The EE also considered that the lack of a GIS/information technology specialist in the project team was an important omission.

Funds were efficiently provided and financial management was adequate (5.1). Just prior to the evaluation, 86% of the total project budget of USD 1 006 830 had been spent or committed. The EE found that the delivery of project activities and outputs was impressive, particularly for Immediate Objective 1, especially since implementation was delayed. The project's activities and outputs are discussed in detail in section 5.2.

The Government of the Philippines has demonstrated great national commitment (5.3.1), for example, by participation in training courses and meetings, by making data available and by contributing in kind (e.g. office space and services). A Steering Committee was established (5.4.2) and updated key stakeholders on progress, but its membership could usefully have been broadened to include the Departments of Environment and Natural Resources and even the Department of Health, for its inputs on control of zoonotic disease.

The EE concluded that a second phase of EAHMI in the Philippines is imperative. As part of this phase, a funding proposal for extension to the sub-region should be developed. The EE recommendations and given in section 7 and more detail is annexed.

The EE's recommendation are that:

Recommendations on continuity of the project	**To whom addressed**
1. A funding proposal for Phase II in the Philippines should be urgently completed, with the project team and national stakeholders taking a lead role in its drafting.	FAO
2. Phase II should expand to more Provinces in the Philippines and should include the priority regions covered by BAI-ICTU, that is, Regions 1, 3, 8 and 11, thus include the three major island groups, Luzon, Visayas and Mindanao.	FAO/GoP
3. A bridging mechanism should be identified to provide funds that maintain momentum from the end of the current project ("Phase I") to the beginning of the next ("Phase II").	FAO/donor
4. The Phase II project should not immediately include other countries in the sub-region, but in the early stages of implementation of the EAHMI Philippines Phase II project, technical staff should take a lead role in the formulation of a detailed funding proposal for a sub-regional EAHM project. Therefore, the design of the Phase II project should include time allocation and funding for their travel in the sub-region to potential partner countries to complete a sub-regional EAHM project appraisal.	FAO/donor
5. The project should organise more Regional workshops in Phase II to continue to develop wider interest and understanding of EAHM.	FAO
6. A sub-regional project, if approved and funded, should have its headquarters based in the Philippines, because this country is establishing unique expertise in the application of the novel EAHM approach and also has good transport links with regional hubs such as Bangkok and has reliable and efficient communication services.	FAO
Recommendations on institutional linkages	
7. The project should create stronger links with Government Departments additional to the DA. In particular, the Department of Environment and Natural Resources (DENR) and the Department of Health should have roles formalised in a future MoU.	FAO/GoP
8. SC membership should be broadened. Consideration and should be given to inclusion of ITCAF, DENR, DoH and the Planning and Policy Division of DA.	FAO/GoP
9. A wider range of stakeholders should participate in workshops, for example, the private sector, cooperatives, NGOs and/or extension services.	FAO/GoP
10. The linkage between EAHMI and the BAI-ICTU should be strengthened: a. The project should provide further technical and hardware support to ICTU as required. b. The project should continue to support the institutional strengthening of the ICTU. c. For at least two years, the project should support two full-	FAO/GoP

time staff in ICTU responsible for database, GIS and systems administration and should seek GoP commitment for their longer-term employment.	
11. The linkage between EAHMI and the Livestock Development Council (LDC), which has a key role in policy formulation, should be strengthened.	FAO/GoP
12. The linkage with the ITCAF, which holds the national information network, should be strengthened.	FAO/GoP
Recommendations on technical staff	
13. The project team should include a GIS/ IT/ RS specialist to deal with technical issues (data cleaning and database management) and provide follow-up guidance to newly trained persons. He/she could be national staff in the Philippines.	FAO
14. The BAI should appoint a full-time staff member as a project counterpart in any future phase. TOR for this post would include responsibilities as administrator, database manager and GIS specialist.	GoP
Recommendations on GIS in EAHM and poverty reduction	
15. Poverty indicators should be given more prominence in the application of GIS to animal disease control (details, Annex 7).	FAO
16. Future studies and commissioned research should be more multidisciplinary, including rural development specialists (such as sociologists and economists), environmental impact specialists and should be more "action-research" oriented to fulfil the principles of people's participation and the holistic approach of EAHM.	FAO
Recommendations on data collection	
17. It is recommended that the project should continue to support the national system of data collection in line with changes planned to improve the system, including the pilot testing and roll-out of standardised data entry software.	FAO
18. More particularly, there needs to be standardisation of data collection and the compilation of a more comprehensive and more accurate database for GIS (detailed recommendations for improved data submission from the field are given in Annex 8).	FAO/GoP
Recommendations on training	
19. A thorough training needs assessment (TNA) is required.	FAO
20. Many more persons (to be quantified after the TNA) should be trained in GIS.	FAO
21. EAHMI GIS training should be divided into three major components, each lasting a week (see Annex 9 for details on the proposed content of this training).	FAO
22. To enhance the incorporation of the technology and EAHM into policy, executives should be offered training.	FAO/GoP

2 Introduction

This report presents the findings, conclusions and recommendations of the External Evaluation Mission (EE) to the FAO 'Environmental Animal Health Initiative' (EAHMI) project that took place 14 to 25 April 2008. This period corresponded to the middle of the third quarter of the third and final year of the project. This was an appropriate time to both take stock of project achievements and lessons to be learned, and to consider possible requirement for future investment.

As per the new FAO Evaluation Policy (Programme Evaluation Report 2007), this was an independent evaluation whose team members were selected for their skills and backgrounds in relevant technical fields, constituting a multi-disciplinary team that covered the key technical and institutional components of the project. The three consultants were:

David Hadrill, Team Leader and Animal Health Specialist,
Camillo Risoli, Institution/Capacity Building Specialist, and
Esteban Godilano, GIS and Remote Sensing Specialist.

Before the EE's field work began, the FAO Evaluation Service (PBEE) sent out a pre-evaluation questionnaire (see Annex 5), intended to provide information from trainees on the training they had received and its subsequent application in their workplaces. The returned forms were forwarded to the EE team members.

Following briefing meetings for the Team Leader in Rome (FAO HQ) and Bangkok (FAO Regional Office for Asia and the Pacific), the team assembled in Manila and spent two weeks reviewing documents and meeting stakeholders. Meetings were held with the key partner organisations of the Department of Agriculture (DA). The Team visited Laguna Province in Region IVa and Nueva Ecija and Pampanga Provinces in Region III. Institutions consulted outside the capital included Provincial Veterinary Offices, Laguna Province Government, University of the Philippines Los Baños (UPLB), Philippine *Carabao* Centre (PCC), Central Luzon State University (CLSU) and the Department of Agriculture's Regional Field Unit (RFU) in Region III.

3 Background and Context

3.1 National context

The Philippines is an island nation consisting of over seven thousand islands in three main island groups: Luzon in the north, the Visayas in the centre and Mindanao in the south. The capital, Manila, is in Luzon.

The population is over 80 million people with an annual rate of increase of around 2.4%. Livestock production is an important source of income for rural smallholders. There is also a large-scale, commercial sector (pigs, poultry and feed-lot beef) relying on imported feed. This sector is mainly located in regions to the north and south of Manila.

Livestock censuses record more head of *carabao* (buffalo) than cattle. The majority of *carabao* (>90%) are kept on smallholdings where they are used principally for draught power and secondarily for milk and meat. Most (>80%) beef cattle are also

maintained in "backyard" conditions. The dairy sector includes more larger scale farms, with around one-third commercial dairy and two-thirds smallholder.

Pork is the most popular meat in the Philippines accounting for over 60% of meat consumed. Production of pork is increasingly commercialised, with a focus in major pig-producing regions of the country.

There are few sheep in the country, but in response to strong demand for goat meat, the number of goats is increasing. Goats are kept by rural smallholders, most commonly tethered each day at grazing, or on semi-intensive government units.

Poultry production is also largely "backyard". However, about 80% of broiler meat is produced by growers contracted to large companies. Ducks are integrated with rice production, often reared in paddy fields post-harvest. Laying ducks are also kept for the production of popular embryonated eggs, *balut*, which are incubated for 14 days. There is a small, but significant and lucrative sector rearing birds for cock-fighting, a national passion.

Most livestock production is in the hands of smallholder farmers. Project interventions that protect and improve animal health can, therefore, be expected to have significant benefit on their livelihood, security and poverty reduction.

3.2 Environmental Animal Health Management (EAHM)

The project covers the application of a novel approach, namely, "environmental animal health management" (EAHM). This approach concerns disease ecology or the interaction of factors in time and space that influence animal disease. These factors may include animal health, production system and environment, and human determinants (anthropogenic factors).

In the context of this project EAHM also means the application of geographic information systems (GIS) to facilitate planning and policy-making. This involves the production of maps that can clearly display the interaction of environmental and other disease determinants. Map production may be preceded by a combination of remote sensing, mathematical modelling and environmental analysis.

The concept of EAHM in many respects builds on concepts utilised in Integrated Pest Management (IPM) in which a range of measures are used to combat crop pests. In IPM, the aim is to apply various inputs and techniques to reduce crop losses in an economically sound manner, without excessive expenditure on the goal of pest eradication. IPM was tested in the Philippines and is now widely applied. With this positive experience of IPM development and its large number of smallholder livestock farmers, the Philippines appears to be a suitable country for trialling EAHM.

3.3 The project: title, duration and budget

The project title is "Environmental Animal Health to Redress Emerging Insect-borne and other Disease Constraints to Smallholders' Livestock Production", symbol GCP/PHI/050/ITA.

". . *and other Disease Constraints* . . " was added to broaden the remit of the project from a more restricted focus on vector-borne diseases in a previous version of the

project's title. The more comprehensive title was approved by the Steering Committee, and replaces the title on the signed Project Document.

In practice, the project is widely referred to as "EAHMI" or the Environmental Animal Health Management Initiative.

The starting date of the project was 05-Sep-05. The project was planned to have a three-year duration. The end date or NTE (not-to-exceed) date of the project has been agreed as 31-Aug-08.

The project budget is USD 1 006 830, provided through trust funds from the Government of Italy.

4 Assessment of Project Objectives and Design

4.1 Justification and relevance

4.1.1 FAO

The project fits with Millennium Development Goals (MDGs) that were subscribed to by most countries in the world including the Philippines, and towards which the UN System has to contribute fully. In particular,

MDG 1 Eradicate extreme poverty and hunger (because sustainable rural development underpins the fight against poverty and, in the Philippines, the majority of farm livestock is maintained by the smallholder or backyard sector).

MDG 4 Reduce child mortality (because reducing the impact of disease on livestock can improve children's protein intake from milk, eggs or meat).

MDG 7 Ensure environmental sustainability (because the EAHMI approach enables policy-makers to visualise environmental factors clearly)

MDG 8 Develop a global partnership for development (because the EAHMI is an holistic approach that is generating wide interest, most recently in a regional workshop, and has potential for building further partnerships).

The project's objectives are in line with FAO's Strategic Framework 2000-2015. Although FAO is in a transition period, and its strategic priorities are being redefined, the project's design is within the framework of poverty alleviation, the contribution of livestock to food security, and sustainable agricultural and rural development, which are core values of the Organisation.

FAO and the World Organisation for Animal Health (OIE) made a strong case (Cairo conference) for addressing so-called neglected diseases: macro-parasites, tsetse-borne diseases, tick-borne diseases, tuberculosis, brucellosis and others. These diseases have significant impact on the daily lives of poor livestock owners: developing strategies for more effectively controlling these diseases is at the core of the project.

In the Philippines, FAO's priorities were stated to be reduction of poverty of small farmers, reduction of environmental degradation, and integration of aquaculture with livestock. EAHMI has a good fit with these priorities.

4.1.2 Government of Italy Cooperative Programme

The Government of Italy (GoI)/FAO Development Programme has aligned its emphasis towards achievement of the Millennium Development Goals, within FAO's reform programme. The programme has three main areas of activities. These are:

1. Sustainable food and agricultural systems.
2. Knowledge exchange and policy.
3. Food security.

The framework of "Sustainable food and agricultural systems" specifies the **livestock sector** as one of its priority areas (the others being water, fisheries and forestry). The framework of "Knowledge exchange and policy" highlights the important area of FAO's activities in support of **knowledge exchange and capacity building**. Projects to be funded in the framework of "Food security" cover those that focus on **production gains** (for example, by diversification of small animal production) and those that focus on access to food. *The EE found that* EAHMI project is extremely relevant to the priority areas of the GoI's Cooperative Programme with FAO.

Furthermore, the evaluation team was told at the Embassy of Italy in Manila that the project fits perfectly with the assistance of the Government of Italy to the Philippines. In the Philippines, rural development is a priority. The GoI also believes poverty alleviation in the rural community in the Philippines to be an effective non-military counter-terrorism measure, as bringing more people out of poverty makes the terrorist agenda less attractive.

4.1.3 Government of the Philippines

The Project Document refers to the Medium-Term Philippines Development Plan (MTPDP) for 2004-2010, which is considered to be the comprehensive governmental plan to fight poverty. Under the Agribusiness chapter three sets of measures were foreseen:

a. production support to enhance farm and fishery productivity;
b. logistical support to raise distribution efficiency; and
c. governance and institutional support to provide a policy and regulatory environment conducive to efficient production and distribution of agribusiness commodities.

The EAHMI approach is relevant to these measures.

At the time of project design, development goals of the Government of the Philippines were identified in a transitional national blueprint, the Agriculture and Fisheries Modernisation Act (AFMA). The EAHMI approach is, again, relevant to these goals which include:

- To narrow the gap between *per capita* nutritional requirement and *per capita* consumption.
- To make livestock products accessible and affordable through increases in production.
- To ensure that the livestock enterprise is compatible with the ecosystem.
- To transform the local livestock industry from a resource-based to a technology-based industry.
- To enhance the competitiveness of the local livestock and poultry sub-sector.

The Government of the Philippines (GoP) is concerned to prevent food shortages in the country and a policy-planning tool that facilitates prevention and control of animal disease is, therefore, of interest to GoP.

The EE considers that the project objectives could well increase information exchange and rational decision-making for livestock policies and, hence, significantly contribute to the main goals of AFMA and MTPDP.

4.1.4 Developmental and institutional framework

Project GCP/PHI/050/ITA was conceived as an institution / capacity building project aiming to promote sustainable rural development and enhanced smallholder livestock production in the Philippines. The Project Document (ProDoc) describes the Philippine's livestock sector focussing on its main subsectors. Upward trends in livestock population estimates at the time of project design are emphasised and the importance of the livestock sector for the national economy is underlined ("the strongest source of agricultural growth in the Philippines during the 1990s").

Livestock smallholders, actually the ultimate beneficiaries of the project, were proved to be very relevant and strategic for the sector. At the time of the project design, they held 96% of buffaloes (*carabaos*), 85% of the cattle for beef industry and approximately three-quarters of pork production. They also represented about 65% of the dairy industry and 70% of the poultry industry.

The principle government body responsible for agricultural development is the Department of Agriculture (DA), which provides the policy framework and support services in pursuit of three main goals: to increase the incomes of farmers and fisherfolk, to generate additional jobs and to achieve greater food sufficiency and stable prices in basic commodities.

The Bureau of Animal Industry (BAI), established in 1930, is one of nine bureaus under DA and has a vast mandate for the livestock sector: it recommends specific policies and procedures governing the production and the flow of livestock products through the market; it prescribes quality standards in the production and distribution chain; it formulates programmes for the development of livestock production, poultry and dairy industry; and it provides technical assistance for the implementation of the same. The Bureau includes seven technical Divisions: Animal Feed Standards, Animal Health, Animal Welfare, Laboratory Services, Livestock Development, Marketing Development, and Research and Development. It is supported by various Administrative Services, including planning and information services, electronic data processing and special project coordination.

The institutional framework of the project GCP/PHI/050/ITA identified the BAI as the leading national coordinating agency, though in close cooperation with other two national agencies, the Philippine *Carabao* Centre (PCC) and the National Dairy Authority (NDA). The PCC was established in 1992 with a mandate to conserve, propagate and promote the *carabao* (buffalo), due to its importance rural farmers (source of draft animal power, meat, milk and hide). The NDA was created in 1995 and was mandated to ensure the accelerated development of the Philippine dairy industry, through policy direction and programme implementation.

At the time of project design, the DA had a considerable portfolio of 48 donor-supported projects, but just a few of them were related to livestock production and animal health. Most animal disease control programmes were executed with technical and financial assistance from various donors, including Australia and FAO for foot & mouth disease (FMD), and the Australian Centre for International Agricultural Research (ACIAR) for surra and babesiosis. The Mindanao Unified Surra Control Approach (MUSCA) was implementing its campaign against *Trypanosoma evansi*.

4.1.5 Rationale of the project

In the ProDoc, Chapter B "Project Justification" gives a clear analysis of key aspects of the livestock sector at the time the project was conceived. The global picture of the sector was defined as a "mix or mosaic" of different production systems. In rural areas, the traditional production system consisting of mixed *carabao*-poultry-rice paddy production was the prevalent farming system. Around major urban centres, the rapid urbanization of the population and the increased demand for pork and poultry products were shaping a mix of semi-intensive backyard livestock smallholders and large scale industrial livestock enterprises.

The ProDoc particularly emphasises the growing "dichotomy and stratification of livestock production" leading to some relevant socio-economic problems, among them:

- The decreasing ability of smallholders "to participate in a rapidly growing and increasingly competitive industry" and the subsequent risk of increasing imbalances between industrial and smallholder producers;
- The negative impact of industrial livestock production on the environment, with serious pollution and degradation risks mainly due to waste disposal and water and air pollution in high-density population areas, particularly the Manila metropolitan area;
- Emerging social conflicts due to conflicting land-use problems over the location of large-scale livestock production close to residential centres.

Following the assessment of major problems outlined above, the ProDoc clearly stresses the high rate of livestock growth and intensification, bringing about new circumstances and specific challenges. In particular:

- The levels of intensification and density of livestock population, combined with the size of production units, were seen as having a potentially explosive effect on the occurrence and spread of animal diseases, including newly emerging diseases, e.g. SARS, avian flu and other novel viruses;
- Increased intensity of production and changing geographical distribution, combined with increased trade in live animals and livestock products, were leading to increased disease risks for livestock and people;
- Insufficient land available for animal waste disposal / recycling and the nutrient overload from intensively reared livestock were causing land and water pollution with increasing environmental risks and impact;
- Such rapidly changing environmental, economic and social conditions, combined with the multiple interactions and feedbacks inherent to livestock

production, were seen as a constraint on the utility of historical data on disease outbreaks and analysis of efficient control strategies;

- Scarce attention had been given until then to the geographical analysis of risk factors and to the development of environmental animal health management strategies for the Philippines.

Coping with those new circumstances and challenges would entail, the ProDoc says, the adoption of dynamic and innovative ways of approaching the broad issue of Animal Health and of novel methods of Disease Risk Assessment. The ProDoc highlights the following:

- Faced with the increasing demand for livestock products and the complex mosaic of traditional, semi-intensive and highly intensive forms of livestock production, the Philippines Government was "keen to pursue a broad, holistic approach to poverty reduction through smallholder livestock development, animal disease control and environmental protection";
- New methods of disease risk assessment were "called for, including the use of geographical information systems, remote sensing, environmental analysis, mathematical modelling and scenario simulation";
- In such a dynamic situation, mapping out hot-spots of potential disease incidence and environmental concern was seen as crucial for a cost-effective system of disease control and of sustainable livestock production.

On the basis of the points exposed above, the ProDoc (B. Project Justification) extensively examines and advocates the implementation of a holistic approach to livestock development through Environmental Animal Health (EAH), defined as a "new discipline" seeking "to assess and understand animal diseases in their environmental and production/farming system context in which they occur in time and space".

Borrowing from the WHO definition relating to humans, "Environmental Animal Health Management" (EAHM) relates to those aspects of animal health and welfare that are determined by chemical, physical, biological and behavioural factors in the natural and social environment of animal production. It also refers to the theory and practice of assessing, correcting, controlling and preventing those factors in the natural and social environment of animals that may have adverse effects on the health of animal and/or human populations".

Furthermore "EAHM seeks to identify cost-effective means of disease management aimed particularly at smallholder livestock producers with limited access to veterinary services" and "builds on the successes and extensive application of Integrated Pest Management (IPM)". Consequent to the envisaged approach of Environmental Animal Health Management and strategic to the achievement of the project aim, the development of a Geographic Information System (GIS) was regarded as an essential tool for analysis and decision-making by stakeholders.

The EE agreed that the Project was well justified in the context of rural development of Philippines and particularly relevant to the livestock sector that was experiencing

dramatic and rapid changes bringing about new and multiple problems and challenges.

The EE equally agreed that the ProDoc was systematic and clear in describing the main needs to be addressed by the project, and convincing enough in proposing the approach and the methods of the Environmental Animal Health Management (EAHM) through the setting up of a Geographic Information System (GIS). *The EE has nevertheless found that* the cost-effectiveness of the system to be put in place deserved a deeper analysis highlighting strong and weak points in view of its sustainability.

4.2 Objectives

4.2.1 Summary of original project goal and immediate objectives

The objectives stated in the Project Document are summarised below. These objectives were not changed after project inception.

The **long-term development goal** of the project is "to contribute towards attaining sustainable agricultural and rural development (SARD) through environmental animal health management (EAHM) for enhanced smallholder livestock production."

The **immediate development objectives** of the project are:

1. Strengthen institutional capacity for EAHM at national and RFU & LGU[1] level.
2. Formulate EAHM strategies for enhanced smallholder livestock production.
3. Promote the integration of EAHM principles in national livestock development policy and planning.

4.2.2 Assessment of objectives

Three main macro-concepts are present in the project goal, that is,

1. Sustainable agricultural and rural development (SARD);
2. Environmental animal health management (EAHM);
3. Enhancement of smallholder livestock production.

The evaluation team has also observed that two of these concepts (EAHM and smallholder production) are reflected in the project title, which, at the same time inserts a new, more specific element that appears in one of the Immediate Objectives: "to redress emerging insect-borne and other disease constraints to smallholder livestock production".

The ProDoc identifies three Immediate Objectives. From the enunciation of the immediate objectives it is clear that Project GCP/PHI/050/ITA was regarded as an institution / capacity building project for enabling national institutions at central and decentralised level to formulate and implement EAHM strategies and policies. *The EE observed that* the three immediate objectives were coherently linked to one another in a logical sequence.

[1] RFU, regional field unit. LGU, local government unit.

4.3 Project design

4.3.1 Beneficiaries

The ProDoc identifies two levels of target beneficiaries:

1. Ultimate beneficiaries: smallholder livestock farmers and livestock consumers benefitting from safer, cleaner and more productive animal production environment.

2. Immediate beneficiaries: the staff of government livestock organizations at central, regional and local levels participating in training on EAHM, in its implementation and in definition of EAHM strategies.

The definition and description of the beneficiaries is poor in the ProDoc. Especially taking into account the nature of the project (institution / capacity building), *the EE deems that* deeper analysis and elaboration of target groups would have given more substance to the project. Quantification of the beneficiaries (immediate or ultimate) is also remarkably lacking.

The ProDoc is very generic about the "the staff of government livestock organizations". It does not supply any useful, specific information about these immediate beneficiaries. However, the EE understands that this element of project design reflects the existence of a large number of agencies in the DA and, therefore, was intended not to limit beneficiaries to BAI staff.

As far as the ultimate beneficiaries are concerned, the ProDoc does not mention a systemic analysis of smallholder livestock producers. Nor does it mention possible means of their participation in the project (individually or in groups).

4.3.2 Project logic

The EE found that the project's design was clear, straightforward and inherently logical, and that the overall design is coherent and encompasses a self-contained project. For each of the three immediate objectives a concrete output is defined. For each output a balanced number of activities are outlined in a logical and quite detailed sequence of technical and methodological steps that give a clear idea of the project itinerary towards its objectives.

The Logical Framework (LogFrame) was well specified: activities, indicators and means of verification are clearly and logically expressed. An exception is lack of detail regarding national staff participating in the various activities of the project. Considering that they are the direct beneficiaries of the project, this failure is relevant.

Risks and assumptions were identified well, particularly as far as the needed institutional cooperation was concerned. On the contrary, a certain underestimation of technical difficulties can be observed, for example, related to the accuracy of the data flowing into the system.

The major risk identified in the Log Frame (see Objective 3 in Log Frame) is the risk that only three years may be "insufficient to fully demonstrate and convince stakeholders of the utility of EAHM". This appears to be quite an embarrassing

statement for an institution/ capacity-building project, since it implies that a major risk of the project is that it fails to achieve its objectives. However, in the light of the EE's observation that the project design conceives it as a kind of "Phase I", this risk becomes an assumption that the whole project should be regarded as an initial, three-year phase of a larger project or programme (see below, Realism of the duration and work-plan).

The project is designed to test a very novel approach to animal health management, using advanced GIS technology to elucidate the relationships between, *inter alia*, livestock production, agricultural and climatic factors, the environment and human activities. There was very little GIS capacity in the main animal health and production institutes in the country before the project. Therefore, it was impossible to know exactly how much time would be required for the establishment of EAHM.

In summary, *the EE has agreed that* the Project Document clearly lays out the main needs to be addressed by the project and the approach and methods, that is, EAHM through assistance to the development of a Geographic Information System (GIS). The design shows a clear intervention logic linking its inputs, activities, outputs and objectives. On the other hand, more efforts could have been devoted to identify the main users of the project's outputs.

4.3.3 Realism of the duration and workplan

In the ProDoc, Chapter B.4 "Project implementation strategy" and chapter B.2 "Expected end of project situation" give further insights on how project designers looked at the project and what their expectations were. In fact, the project was basically conceived in three stages to be implemented one-at-a-time, in sequence, one per year for three years. As the ProDoc, says "The initial timeframe set for the project is three years, divided into three phases corresponding with the three primary objectives".

The three stages of the project (corresponding to the three immediate objectives and relative outputs) were defined as follows:

- stage 1 (first year): Establishment, training and data gathering;
- stage 2 (second year): Data analysis, prioritisation, modelling and EAHM strategy formulation;
- stage 3 (third year): Promotion and mobilisation for application and extension.

By analysing in more depth the content / activities of each phase and their Chronogramme (see ProDoc, Annexe 6) a certain mechanistic simplification appears in the design, which could impede attainment of the expected outputs and objectives in the proposed timeframe. For instance, as the whole project is fundamentally an institution/ capacity building project, it seems unrealistic to plan that the training needs assessment and all the training design should be done in the first two quarters of the first year (see activity 1.2 in the Chronogramme). A more flexible approach and alternating formal courses with on-the-job training throughout the duration of the project would seem to be a more appropriate training design. In fact, the project has carried out training activities during the 2nd and 3rd years.

The ProDoc states that in stage 2, "Various EAHM options for enhanced smallholder livestock production will be examined for each of the main ecozones/ production systems, and appropriate strategies will be formulated and costed for implementation in pilot areas". It seems ambitious to squeeze all the relevant and complex tasks foreseen in Stage 2 into one year and to obtain by the end of the second year a meaningful and comprehensive EAHM strategy.

The possible inadequacy of the project timeframe should, however, be assessed in the light of a key statement in ProDoc Chapter B.2 Expected end of project situation: "Given the innovative nature of the project and the holistic approach to EAHM being promoted, however, it is envisaged that at least one and possibly more follow up phases will be required to consolidate the achievements of the initial preparatory phase. The initial phase will demonstrate the approach, identify priorities and develop a range of EAHM strategies for various circumstances. Subsequent phases would then be mobilised to implement those strategies and monitor their progress to demonstrate their utility and cost-effectiveness."

Therefore, *the EE has concluded that*, although Project GCP/PHI/050/ITA was designed as a self-contained project, the need and prospect of a possible subsequent phase was inherent in its conception and design. Actually, the whole project was seen and explicitly defined as an "initial preparatory phase" and that prospect should also be born in mind during the evaluation. The activities successfully completed at the time of evaluation correspond to good delivery of a preparatory phase and there was an appropriate time planned in the design of the project to enable full implementation of activities that have strengthened institutional capacity. However, completion of the other two of the project's immediate objectives, formulation of EAHM strategies and the incorporation of EAHM into national policy, would probably always have required more time than the three years planned in the design of this project.

The ProDoc describes in detail (see B.4 Project implementation strategy) indicative GIS data layers to be acquired. The Chronogramme designates the first two quarters of year one for activity 1.5, 'Review data sources on disease incidence, production systems, socio-economic and environmental conditions, and identify gaps' and the whole life of the project for activity 1.8 'Organise data collection and reporting network and develop GIS . . .' However, the design of the project may have assumed that more accurate and complete data existed than was the case when the project began. In fact, data cleaning took considerable time at the start of implementation.

4.3.4 Clarity and precision

As noted in section 4.3.1 Beneficiaries, *the EE observes that* in the ProDoc there is no reference to the expected numbers of trainees: results / outputs are not quantified and, hence, not verifiable. This is an important omission given that a) training activities are a core component of the project and b) national staff to be trained and involved are the immediate beneficiaries.

Outputs and activities are clearly described. Adequate detail is provided to enable fulfilment of the immediate objectives.

However, an activity "Familiarisation with molecular genetics" (Activity1.7 for Output 1), was listed in the ProDoc in Chapter D Immediate Objectives, Outputs and

Activities. This activity was subsequently deleted at project inception. The inception report noted that there is no other reference to "molecular genetics" in the ProDoc. The presence of this activity in the ProDoc appears to be anomalous.

A new activity, "Commission environmental animal health studies" was added under the first immediate objective/output. This activity became an important component of the project and, perhaps, should have been foreseen at the time of project design.

In the design of the project, the small implementation team lacks a computer technician, specifically an Information Technology person with expertise in database management and GIS. Such a person could a) play a key role in establishment of the necessary data for developing maps, data on which the project outputs depend, and b) provide follow-up on-the-job training to project-trained personnel in their workplaces. *The EE considers that* the lack of a GIS specialist in the team of project personnel described in the ProDoc is an important omission, although it was partially addressed in the job description of the Associate Professional Officer (APO) post.

4.3.5 Management structure

In the ProDoc, section B.5, the Bureau of Animal Industry (BAI) is specified as the lead implementing agency for the project in close coordination with the Philippine *Carabao* Centre (PCC) and the National Dairy Authority (NDA). *The EE agrees that* the BAI is the key bureau within the Department of Agriculture (DA) within which the project should be situated.

The ProDoc foresees coordination and linkages among, *inter alia*, appropriate field Regional offices and units of the DA and their respective Local Government Units (LGU) counterparts. A specific coordination was foreseen with the initiatives of Mindanao Unified Surra Control Action (MUSCA), by training its personnel. These linkages are appropriate.

The ProDoc describes a Steering Committee (SC) for provision of policy direction, composed of representatives of livestock agencies, the private agricultural sector and GoP coordinating and policy-making bodies. Given the cross-cutting nature of the new discipline of EAH, *the EE considers that* the SC should have included representation of the Department of the Environment and Natural Resources and, perhaps, the Department of Health and the Policy and Planning Division of the DA.

The EE considers that the provision of technical management by FAO described in the ProDoc is appropriate, through a Chief Technical Adviser (CTA), appointment of a National Expert as a Senior Environmental Animal Health Officer and technical back-stopping support from headquarters and from the FAO Regional Office for Asia and the Pacific (RAP) in Bangkok. Similarly, the appointment of a National Project Coordinator from the BAI is appropriate.

5 Assessment of Project Implementation, Efficiency and Management

5.1 Project budget, expenditure and financial management

At the time of the Team Leader's briefing in HQ on 09-Apr-08, the financial data held in the Field Programme Management Information System showed delivery (in terms

of project funds spent and committed) of USD 864 698. This represents 86% of the total project budget of USD 1 006 830. The rate of expenditure of the project budget reflects good delivery of project outputs and is entirely reasonable at the time of evaluation, that is, three to four months from the end of the project.

No problems were identified with any aspect, including timeliness, of fund availability from both Italy and the Philippines. Within the Philippines, the budget holder for the project was the FAO Representative (FAOR). The FAOR's office was reported to have handled the budget and payments very efficiently and effectively. It had organised a budget revision when necessary and made Operational Field Advances available to the CTA when required.

5.2 Activities and outputs

The EE found that the project activities and outputs closely follow those envisaged in the Project Document, with particularly good results in relation to Immediate Objective 1. Indeed, delivery is impressive given that, at the time of the evaluation, activities planned over three years had all been implemented in under two years.

5.2.1 Systematic assessment of outputs to date

Immediate Objective 1: Institutional Strengthening and Capacity Building

Activity 1.1 Appoint/recruit staff

The EE found that the recruitment by FAO of the Chief Technical Advisor was delayed by nine months. This contributed to significant delay in or lack of activities being implemented in the first year of the three-year project. No clear explanation was provided to the EE. However, the slowness of the process in FAO headquarters was considered to be the main cause of the delay.

FAO failed to recruit the Associate Professional Officer described in Annex 1C of the Project Document, which was significant in such a small team with just two other key technical members, who are the CTA and the National Expert (Senior Environmental Animal Health Officer). The mission was advised that FAO sent application details for the APO post to the Italian Government, but suitably qualified persons did not apply.

Activity 1.2 Assess training needs and arrange training courses, workshops, study tours etc.

The needs assessment was carried out by the project team. However, it was not preceded by a clear definition of the specific skills to be acquired by the trainees at the end of the training. Also, there was no apparent planned quantification of the trained personnel.

The project has arranged training courses by sub-contracting training institutions: for details of the training conducted, see Annex 6. Workshops have been carried out, most recently a workshop involving the Animal Production and Health Commission for Asia and the Pacific (APHCA), the *APHCA-EAHMI International Workshop on Geographical Information System Applications in Animal Production and Health,* held in Metro Manila, 3-7 March 2008. More workshops are planned before the end of the project, in particular, important meetings that should lead to the production of policy briefs.

Although the number of GIS technicians required by project partners is limited, the EE found that the number of persons trained by the project was quite small, that is, 28 of whom 13 are women and 15 men. They participated in GIS training courses run by the three training institutions. These institutions were GeoData, the National Mapping and Resource Information Authority (NAMRIA), and the Training Centre for Tropical Resources and Ecosystems Sustainability (TREES).

Well-trained people knowledgeable in spatial analysis and skilled in using GIS software are essential to the GIS process. Arguably, the most vital component of this project is building capacity of the local beneficiaries in the national government. Building their capability in GIS was accomplished through formal and informal training.

Ten persons attended the prestigious ESRI/GeoData (Environmental Systems Research Institute, Inc.) Users' Conference in Manila in 2006. In this conference, participants had great opportunities for new discoveries in GIS analysis, product updates, and most important of all, establishing networks with other GIS practitioners in the industry.

The EE considers that the two weeks duration for GIS training organised by the project was very tight. Four major topics were covered, namely

1) GIS basic and advanced module,
2) remote sensing (RS),
3) global positioning systems (GPS), and
4) photogrammetry.

All are very important subjects and relevant to the project: these are generally regular one or two semester courses in a University.

Training focussed mainly on GIS and GPS. It could usefully have been preceded by training in data management, followed step-wise by training in GIS and spatial analysis. This would more logically and comprehensively reflect the stages in the process of facilitating the development of a GIS framework for the DA-BAI in the Philippines.

It should be noted that many participants had prior knowledge of and experience in GIS before the start of the project. For example, most of the GIS staff at the ICTU, Regions and local Universities working in this project are GIS practitioners. This situation in the Philippines helped put this project in "running mode" from the very start and helped it achieve its impressive range of outputs in less time than originally planned.

Interviews with participants of training courses organised by the project confirmed the views expressed in the returned questionnaire forms (for more details on the responses to the questionnaire, see section 5.2.2). That is, the training was considered by be very useful. Trainees seemed to derive a lot of value from applying the theory to a practical project from their area of work, thus rooting the theory into potential applications in their workplace. This experience undoubtedly contributed to the frustration expressed by a number of them that the application of the training was limited because they did not have access to new versions of ArcView software as used

during the training. Expectations of some participants had been raised that the project would procure new, licensed versions and provide them in their workplaces.

Activity 1.3 Procure equipment
This was not an equipment-intensive project. Computer hardware was procured and distributed in a timely manner, including a server unit installed in ICTU. ArcView GIS and Spatial Analyst software has been provided to BAI and a floating licence arranged that enables the use of the copy by several named groups on the local area network. This arrangement is cost-effective and serves BAI's needs very well.

The procurement of further copies of the latest version of ArcView and Spatial Analyst GIS software, with stand-alone licences, has been delayed excessively (six months) and unreasonably. These copies are for use by project partner institutions including Region III, PVO-Nueva Ecija, PVO-Laguna, PCC and possibly MUSCA.

The EE has seen evidence of significant efforts by project management to expedite the procurement, but the inability to deliver this software to trainees in their field positions both impairs their ability to fully apply their training and reflects poorly on FAO's administration. At the time of the evaluation, the issue required rapid resolution.

Activity 1.4 Establish collaborative links with animal health, livestock production and environmental Organizations, and arrange for regular exchange of information, with designated focal points in each participating member of network.
Very early in implementation a Memorandum of Understanding was signed, specifying the collaborating institutions. Focal points were identified at central, regional and provincial levels.

The members of the Steering Committee were agreed and the SC was established (see Section 5.4.1 above. *The EE considers that*, although not specified in the ProDoc, broader representation on the SC would have been beneficial (see Section 5.4.2).

Activity 1.5 Review data sources on disease incidence, production systems, socio-economic and environmental conditions, and identify gaps
The project gathered data from various sources including, for example, poverty data from the National Statistical Coordination Board, human population census data from the National Statistical Office, an extensive agricultural database from Bureau of Agricultural Statistics, laboratory data from the Philippines Animal Health Centre (PAHC), disease incidence data from BAI including Regional and Provincial offices, environmental data from Department of Environment and Natural Resources, climate data from the Weather Bureau (PAGASA).

The project successfully cleaned data making it suitable for GIS analysis. Gaps were identified and approaches made at provincial level to plug gaps using GPS, global positioning systems. The project made recommendations to the DA through BAI and the Livestock Development Council to conduct a detailed livestock survey similar to that carried out for poultry in connection with bird flu (highly pathogenic avian influenza, HPAI) preparedness.

The EE found that gaps still occur in the detailed data on livestock diseases. This remains an important activity to complete. Without comprehensive, detailed, reliable

animal health data, output maps have less value, and confidence is reduced in their use for promoting particular policy directives.

Activity 1.6 Assess attributes of available satellite imagery and obtain most appropriate forms

This was done through a three-stage study by a consultant (W. Wint, Environmental Research Group Oxford - ERGO). The project has already provided the satellite imagery (LANDSAT and MODIS) from this component through the DA to the Information Technology Centre for Agriculture and Fisheries (ITCAF), and it now resides in the National Information Network, from where it can be accessed by other bureaus and attached agencies of the DA.

Activity 1.7 Familiarisation with molecular genetics

The EE noted that this activity was removed following the project inception report's recommendation. It was replaced with ***Activity 1.7 Commission environmental animal health studies identified during inception visit of AGAH***.

The project has commissioned, through the FAO sub-contract formal Letter of Agreement (LoA), namely:

1. GIS-aided study of environmental animal health and production in Laguna Province, Philippines (UPLB, School of Environmental Science and Management - SESAM);
2. Collaborative technical review of the current state of knowledge about surra (*Trypanosoma evansi*) in the Philippines (Central Luzon State University - CLSU College of Veterinary Science and Medicine) and University of Southern Mindanao);
3. Review and synthesis of current state of knowledge about animal production and disease constraints in and around the Candaba Wetlands, Central Luzon, Philippines (CLSU College of Veterinary Science and Medicine);
4. A GIS-aided study of integrated aquaculture and livestock/ poultry production in the Philippines (CLSU College of Fisheries);
5. Remote sensing, image processing, multivariate analysis and predictive mapping of animal resource and disease distributions in the Philippines (ERGO);

Further advocacy of study recommendations by SESAM is planned and, at the time of the evaluation, was pending closure of the accounts for the LoA for their study named above. *The EE considers that* these activities were very useful studies, consistent with the objectives of the project.

Activity 1.8 Organize data collection and reporting network and develop Geographical Information System (GIS), focusing on livestock production, animal diseases and environmental conditions

Data collection has been organised by networking with State Colleges and Universities, Regional Field Units (RFU) in Regions III and IVa and Provincial Veterinary Offices (PVO) of Laguna and Nueva Ecija, PCC and MUSCA. The development of GIS is still in progress and requires procurement of the software. The essential need for comprehensive and accurate data has been outlined under Activity 1.5 above: this remains a constraint on development of the GIS.

Immediate Objective 2: EAHM Strategy Formulation

Activity 2.1 Preliminary analyses to identify priority issues for EAHM strategy formulation

The project identified four priority animal diseases: surra, haemorrhagic septicaemia, foot and mouth disease and fascioliasis/fasciolosis. The project has identified animal waste management and integrated aquaculture and livestock/poultry production as important environmental issues and potential animal and human health concern.

Activity 2.2 Participatory livestock production and disease constraint assessments and stakeholder workshops in main eco-production zones

Participation of the ultimate beneficiaries of the project, the smallholders, is a weak area of project implementation. The EE did not find any evidence of their active participation in assessments. Stakeholder workshops have taken place, but have been at a higher institutional level.

Activity 2.3 Multivariate analysis, modelling and mapping, with following indicative products:

a) Livestock density maps
b) Livestock: human ratio maps
c) Vegetation and land use/land cover maps
d) Ecosystem/production system maps
e) Vector habitat maps
f) Disease risk/hot spot map
g) Excreta density maps

This has been partially covered by the project, specifically by the consultancy of W Wint in November 2007 – see Consultant's Report "Spatial Analysis of Selected Livestock and Animal Disease Distributions in the Philippines – Step III, Multivariate Distribution Modelling". Maps were produced by trainees in the applied practical component of the course run by TREES. Maps have also been produced in other commissioned studies. However, the EE found that there is a need for further development of this activity.

Activity 2.4 Prepare EAHM implementation strategies to address priority issues, focusing on smallholder livestock production

The project has prepared work plans and strategies which have been followed in implementation. However, a clear focus on smallholder livestock production is difficult to identify.

Immediate Objective 3: EAHM Promotion and Integration

Activity 3.1 Host field level and national workshops to present and seek endorsement of proposed EAHM strategies and their integration in national livestock/agricultural development strategies and policies

This process has begun with a Surra Panel Meeting held in April 2008. The project prepared a Policy Brief on surra and fascioliasis/fasciolosis. Further workshops on animal husbandry and waste management in Laguna Province, and integrated aquaculture and livestock/poultry production in Pampanga Province are scheduled for May 2008.

This component could be more fully evaluated after the project's end in August. However, without doubt, more time than is available up to project NTE is required to more fully integration EAHM into national policy-making processes.

Activity 3.2 Raise awareness and promote utility of EAHM, through dissemination of outputs targeted at producer groups, government decision- makers, professional bodies and planning authorities

Presentations have been made at international meetings in Italy and Thailand (see Annex 6 – Summary of EAHMI Awareness-raising and Training Activities). Presentations have been made to the Philippine Veterinary Medical Association (PVMA) and to the Philippine Society of Animal Science.

A website has been developed, hosted by BAI and managed by ICTU. The EE was not made aware of coverage by the press or TV, nor publications in scientific journals. However, an excellent project CD-ROM has been produced for wider dissemination of information acquired. This resource compiles all project reports and related information, DVD data discs of MODIS satellite imagery and the project's GIS folders and files.

Activity 3.3 Seek continued support for coordination unit for implementation of EAHM strategies, through soundings and preparation and submission of detailed, fully costed proposals for funding

Strong steps have been taken towards securing support for continuation of EAHM strategies. There has been a Tripartite Review. A draft Concept Note has been prepared. Informal discussions with the Government of Italy in the Philippines have taken place, preparing the way for submission of a full proposal. However, more work is required to prepare a funding proposal, pending the decisions taken following this evaluation.

5.2.2 Pre-evaluation questionnaire on training

The FAO Evaluation Service (PBEE) distributed a pre-evaluation questionnaire by email to 31 persons on a list compiled by the project. The form is in Annex 5. The questionnaire concerns training courses attended: the quality of training, its relevance to the work of the trainees and any further support required. The EE terms of reference (see Annex 1) refer also to another pre-evaluation questionnaire for policy making bodies, to be prepared and circulated by PBEE, but this did not happen.

The initial response to the training questionnaire was disappointing. After reminders from PBEE and from project management, eight persons returned forms (a total of 15 forms as some attended more than one course) and two other emailed to state that they had not completed the forms because they were not relevant to them. One of these two was a trainer, not a trainee, and the other was the leader of a study funded by a project letter of agreement (LoA), equally not a trainee.

The EE found that eight out of the 31 on the list had not attended any training (one other attended, but did not finish). As only 23 persons actually attended one or more project training courses, the response was from eight out of 23 who attended training, or about one third.

It is not known what other factors may have influenced two-thirds of those emailed not returning any response. For example, it could reflect general satisfaction, or reluctance to make negative comments, or apathy, or that emails simply were not received/seen.

However, the mission reviewed the returned forms and has collated the respondents' comments. A common comment was that software could have been provided to the trainees. However, there are licensing and cost issues preventing the project from widely distributing ArcView software.

Text box. Summary of key comments from respondents

What was good about the training?

- "Mix of lectures and practical exercises; development of individual projects."
- "Training has been applied to my work in mapping supply and demand of livestock products."
- "The training will help with data handling as a tool for animal disease control and prevention in my daily work [BAI-ICTU]."
- "I realised GIS in animal health provides information to carry out control activities necessary to contain and eliminate animal diseases [Nueva Ecija Province LGU]."

What could be improved?

- "More time should be allotted to GIS database design."
- "Advanced, follow-up training (several respondents)."
- "Provide GIS software (several respondents)."
- "A high quality GPS gadget."

In general, all respondents rated the training as "well above average" or "very good" (on a six-category range from lowest "very unsatisfactory" to highest "very good"). However, meaningful, quantitative data cannot be derived from the response from eight out of 31 persons, especially as the 15 completed forms do not all refer to the same course.

5.3 Government support and institutional setting

5.3.1 Government Support

The Government of the Philippines (GoP) contribution (see ProDoc Annex 4B) was provided with minor variations. The Government contribution included staff salaries, provision of office space, service bills for the project office, travel costs for participants to attend training courses, and the National Project Coordinator has access to her own official vehicle that has been used for some project journeys.

The creation in July 2006 of an Information and Communication Technology Unit (ICTU) inside the BAI is highly relevant institutional support by the counterpart. As specified in the order that created the ICTU (Special Order no. 45 of the Director of the BAI), the Unit "shall coordinate within the Bureau on information technology concerns in order to avoid duplication and/or redundancy of activities and thereby maximize whatever available resources the different divisions/units/programs/projects may have". Subsequently, EAHMI has strengthened its linkage to ICTU further:

- It has sponsored the attendance and poster presentation by an ICTU staff member at an international OIE conference on GIS application in veterinary services in Italy in 2006;
- It has provided funding for a staff member (LAN manager; funding now continued through another FAO project);
- It has commissioned the preparation of an EAHMI webpage on the BAI website; and
- It has provided GIS hardware and software to the ICTU.

The DA Regional Office in Region III created its own ICTU and assigned two permanent staff to work on GIS and database management. It likewise provided the hardware and software (ArcView 3.3 with FAO expected to provide ArcGIS through this project).

The GoP helped to make animal disease and other data available. For example, the data on foot and mouth disease held by the Information and Communication Technology Unit (ICTU) was made freely available. However, in the early part of the project, access to GoP laboratory records held by the BAI's Philippines Animal Health Centre (PAHC) was reported to have been delayed by at least six months.

Great national commitment has been shown towards participation in training courses and workshops run by the project. A number of individuals in key institutions who were met by the EE (e.g. in NDA, in PVO Laguna, in SESAM, in RFU III, in the CLSU College of Fisheries and College of Veterinary Science and Medicine) had become strong advocates of the EAHMI approach.

5.3.2 Institutional setting and functioning of coordination

Bureau of Animal Industry

The project is situated in the Bureau of Animal Industry of the Department of Agriculture. The Director of BAI is EAHMI's Project Director and the Head of BAI's Livestock Development Division is the part-time National Coordinator. Monthly meetings have been held attended by the National Coordinator and representatives of other key institutions working with the project, such as the PCC. The EE did not see minutes of these meetings, but gained an impression that lines of communication and coordination between the project and the BAI's wider activities could have been stronger. For example, GIS training organised by the project on one occasion coincided with another course organised by an Australian-funded FMD project: both courses were suitable for attendance by some of the same trainees. Closer coordination could have prevented this situation from arising.

Livestock Development Council

The Livestock Development Council (LDC) oversees the President's *Ginintuang Masaganang Ani* programme for livestock production (GMA-LP). The objectives of GMA-LP are to ensure food security, to alleviate poverty, to enhance incomes and profitability and to achieve a globally competitive livestock and poultry sub-sector.

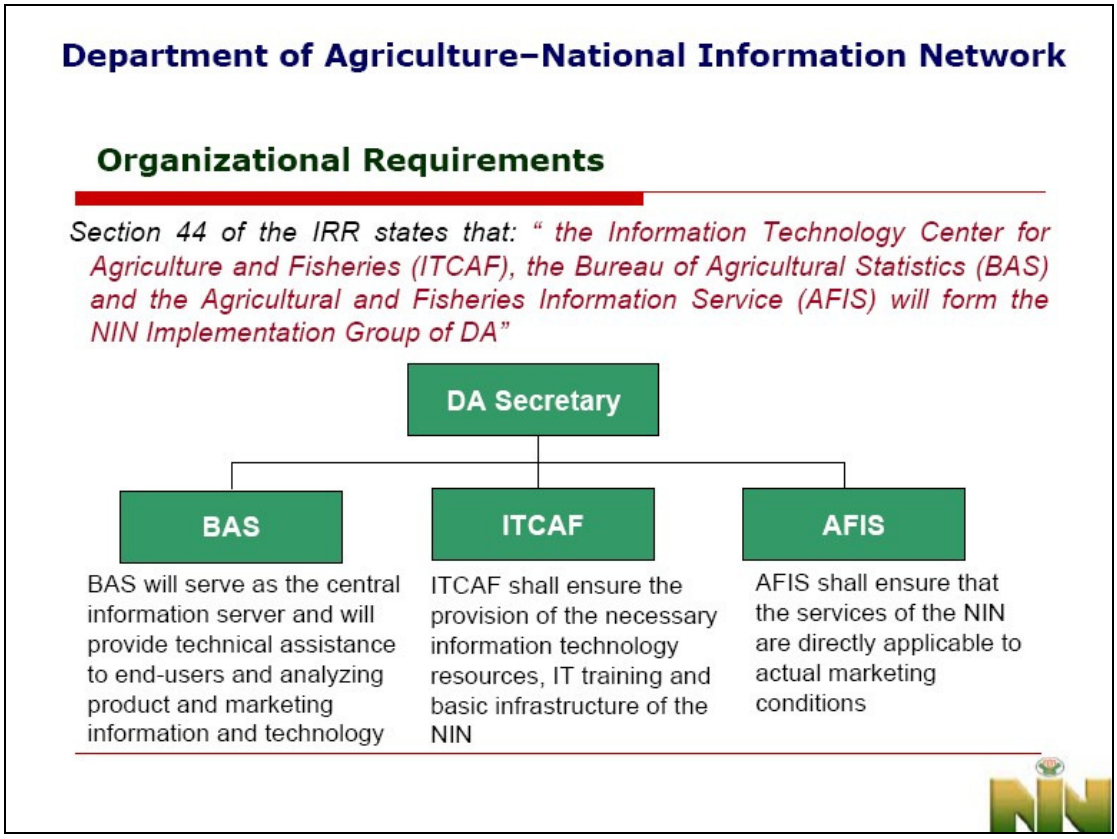
For its role in strengthening technical capacity, the project's placement in the BAI seems entirely appropriate. As the project moves further towards influencing policy development, it will need to work more closely with the Livestock Development Council (LDC), because this institution has a clear role to influence policy in the livestock sector. LDC is properly represented on the Steering Committee.

Information Technology Centre for Agriculture and Fisheries
The Information Technology Centre for Agriculture and Fisheries (ITCAF) will have an integral role in the Department of Agriculture's National Information Network (NIN). The role of ITCAF in NIN is illustrated in the Figure 1, below.

NIN is described in the Agriculture and Fisheries Modernization Act (AFMA), approved by the President of the Philippines in 1997. AFMA stipulates the government's policy to ensure the development of the agriculture and fisheries sectors in accordance with the principles of poverty alleviation and social security; food security; rational use of resources; global competitiveness; sustainable development; people empowerment; and protection from unfair competition.

In AFMA, NIN is planned "to link the various research institutions for easy access to data on agriculture and fisheries research and technology. All departments, agencies, bureaus, research institutions, and local government units shall consolidate and continuously update all relevant information and data on a periodic basis and make such data available on the internet." [2] There appears to be a clear overlap of mandates between EAHMI and ITCAF – NIN, which is not emphasised in the institutional linkages observed by the EE.

Figure 1. The role of ITCAF and other key organisations in the DA National Information Network.



[2] See http://unapcaem.org/Activities%20Files/A17/AETIS%20COUNTRY%20REPORT.pdf accessed 05-May-08.

Regions and Provinces
The project developed strong working relations with Region III. In Laguna Province, there was clearly a close working relationship with the Provincial Veterinary Office (PVO), but in Nueva Ecija a change of Governor appeared to have caused uncertainty about the status of the PVO, which has made the project's work there more cautious.

Philippine Carabao *Centre*
The Philippine *Carabao* Centre (PCC) has been an active project partner institution. However, there remains great potential for it to more fully utilise GIS in its programme of work. A workshop for several days, to fully discuss and agree how to use the available data, would probably be very useful.

National Dairy Authority
The National Dairy Authority is also a project partner. Some of its staff members have attended training courses and project meetings, but there appear to have been few tangible outputs to date.

5.4 Project management and external support

5.4.1 Project office and FAO Philippines management

The efficiency of delivery of project outputs clearly reflects highly effective management and the dedicated work of the small project team, which consists of CTA, National Expert, Administrative Assistant and Driver/Clerk. The CTA has efficiently coordinated, sub-contracted various studies, and provided technical specifications for procurement and so on. He has been ably assisted by the National Expert (Senior Environmental Animal Health Officer) whose network of contacts in-country has helped the project rapidly build bridges with partner institutions. Project interim reports have been timely presented in FAO standard format and clearly show progress.

Most of the administrative burden, including procurement, budget management, has been handled by the FAO Representation. This has proved beneficial for technical implementation by freeing the small project team to focus on field implementation.

5.4.2 Steering Committee

A Steering Committee was established and has met twice. Its membership consists of:

- Under-Secretary of Agriculture (Chair of the Committee)
- FAO Representative in the Philippines
- Special Coordination and Monitoring and Assistance Division (SPCMAD) of the DA Programme Development Service
- National Economic Development Agency
- BAI
- Philippine *Carabao* Centre
- Livestock Development Council
- National Dairy Authority
- National Meat Inspection Service
- Philippine Council for Agriculture, Forestry and Natural Resource Research and Development (PCARRD)
- Regional Field Units III and IV

- PVOs of Laguna and Nueva Ecija

The SC appears to have played an important role in keeping key stakeholders advised of project progress and plans, a major purpose of the committee, but a lesser role in project management or policy direction. The project could probably have benefited from more feedback on its annual work plan by the SC or some other advisory group.

The EE notes that ITCAF is not represented on the Steering Committee. *The EE also notes that* the Planning and Policy Division of the DA is not represented, nor is the Department of Environment and Natural Resources, nor the Department of Health. Thus, the project lacks this direct, formal linkage to these Departments, which have potential to have important roles in EAHM implementation. An important role of the Department of Health in EAHM could be envisaged in, for example, defining policy for rabies control.

There was a Tripartite Review in November 2007 favourable to possible continuation of the project. Subsequently, a Draft Concept Note has been prepared and informally circulated. The Tripartite Review helped secure verbal commitment from the Italian authorities for continued funding for the project in the Philippines and led to the development of a draft concept note for the next phase in the Philippines and start-up in new territories.

5.4.3 FAO Technical and Operational Backstopping

Both the operational support and the technical backstopping by FAO were adequate and have helped with the efficiency of delivery. Animal Health Officers from FAO headquarters Animal Health Division (AGAH) have visited the project twice, which was appropriate.

Whilst recognising the heavy workloads of staff in FAO HQ, perhaps more response could have been provided on technical and other reports submitted by the project. Such feedback can provide direction and important motivation to teams in the field, particularly with regard to the innovative approaches being developed and their wider relevance and application.

6 Assessment of Results and Effectiveness

6.1 Effects and impact

6.1.1 Use of outputs by target groups

There are two groups of beneficiaries targeted by the project, that is, the ultimate beneficiaries, who are smallholder livestock farmers and livestock consumers, and immediate beneficiaries, who are the staff of government livestock organizations at central, regional and local levels. The ultimate beneficiaries are expected to benefit from a safer, cleaner and more productive animal production environment. The immediate beneficiaries are expected to benefit by participating in training on EAHM, in its implementation and in definition of EAHM strategies.

Whereas the ultimate beneficiaries have not yet seen much impact from EAHM, the staff members of government livestock organisations have been very positively

affected by the project. Training has resulted in building capacity in the application of GIS in key organisations at national and more local levels; hardware and software has strengthened the ICTU; the EAHM concept is beginning to be applied to planning in several organisations. For example, GIS has been applied by the PVO, Nueva Ecija to map the livestock population by *barangay* for HPAI preparedness; the PVO has found that maps of disease occurrence and population have helped with planning rabies vaccination campaigns; map outputs by CLSU (College of Veterinary Science and Medicine) have been able to suggest geographical regions where surra control efforts should be concentrated; CLSU (College of Fisheries) has used GIS in a prediction model to show locations suitable for integrated aquaculture and livestock/ poultry farming.

6.1.2 Databases and decision maps

Quality databases

Data is the core of any GIS, and it is estimated that approximately 60-80% of GIS project costs are due to data. Data alone, however, is not enough: data integrity and currentness are important components in database development and management. Any GIS project will be compromised if these requirements are not met, because of the spatial nature of the database when put into a GIS environment. The creation of a clean digital database is the most important and time-consuming task upon which the usefulness of the GIS depends. The establishment and maintenance of a robust spatial database is the cornerstone of successful GIS implementation.

EAHMI has prioritised these problems and the EE believed that this aspect has contributed to some of the delays in generating the needed output maps. The EE also believed that inconsistency, or unavailability, of the data required for this project was not anticipated. Existing data collected from other agencies were closely examined and "cleaned" before conversion to a GIS enabled format. In addition, new data are required and must be generated by conducting field surveys using GPS instruments. What is lacking in the project is the documentation of GIS datasets and maps, known as METADATA, that is, data about digital data. The impact of EAHMI will be constrained until the data is in place. This deficiency has been recognised by project management and metadata are being compiled for EAHMI GIS files.

The informants met during the EE's field visits in Region III and Region IV-A strongly emphasized the streamlining of data collection as well as reporting systems. The PVO of Laguna stressed that for the same datasets, at least five forms are submitted separately to the different sectors in the Department of Agriculture, and LGUs.

The EE believes that a common database template is required. This would result not only in enhancing data entry and eliminating redundancy, but also in speeding-up the reporting systems. The database should be likewise GIS enabled, which means creating "linkable fields" to the GIS attribute files. *The EE believes that* the template should be designed for this project and then the project's impact may be significantly increased.

Decision maps output and full-time partner staff

Exempting maps produced by commissioned studies, the EE did not see any quality decision maps as an outcome (i.e. product by participants in training) of the GIS training. This could be explained by at least two factors: (1) beneficiaries require

more training and guidance, and (2) these government staff are not working full-time in GIS. It may also suggest that the training was not long enough: recommendations for more comprehensive training are given later in this report. Additionally, it may have been useful to have provided more follow-up on-the-job technical support to trainees after they returned to their workplaces. The EE noted that none of the project team members work full-time on GIS.

In the opinion of the EE, in a GIS laboratory and in any GIS project, no fewer than two full-time personnel are required to maximize the use of GIS, at least for the first two years. Part-time staff secondments are not the solution, however numerous. Two full-time staff tasked in GIS and database management should be organic staff of the organization and not project staff appointments, who will end his/her engagement once the project is completed.

The omission of such staff members may be a cause of poor impact of some past GIS projects, in the opinion of the EE. A full-time counterpart project staff member, in the BAI-ICTU, for example, is required. He/she would have TOR combining systems administrator, database manager, and GIS specialist rolled into one. *The EE believes that* impact of the project will be enhanced if BAI takes the necessary steps to create this full-time post.

6.1.3 Progress towards achieving project goal and objectives

Objective 1: Institutional strengthening and capacity building

The project has definitely strengthened institutional capacity for EAHM. Training activities have significantly enhanced the capacities of partner institutions in making use of GIS. Awareness of GIS has been raised through a wide range of communication tools including printed map posters, workshops and presentations. The effectiveness of GIS has been stressed by many stakeholders, particularly GIS's tremendous capacity of visualisation.

Objective 2: EAHM strategy formulation

The mission judges that the real effectiveness of the project and the substantive impact of EAHMI can only be achieved when two crucial conditions are in place:

1. the counterpart, partner institutions and stakeholders meaningfully and systematically adopt GIS as one of their core decision-making tools for the planning, monitoring and evaluation of their programmes;

2. GIS is recognized as a powerful tool for the management of Environmental Animal Health and not an objective in itself.

A technical tool like GIS has obviously more appeal and can be more easily handled than a methodological approach like EAHM. However, the project's objectives refer to the formulation and integration of EAHM strategies and policies.

Objective 3: EAHM promotion and integration into national policy

At the time of the evaluation, EAHM had not significantly impacted on government policy. This reflects both ambitiousness in the design of the project (despite it foreseeing the need for follow-up) and also delay in start-up due to late recruitment.

A poverty map has been produced, but the EE has not seen any decision maps as an output from those who have undergone GIS training (here the EE exempts commissioned studies). In summary, the impact of EAHM and integration is limited at this stage. The results have been generated, but need to be transferred to the level which more directly impacts on smallholder farmers. The project should ensure that GIS technology is integrated and aligned more closely with the overall goal of poverty alleviation for smallholders. For detail on the EE's view on integration of GIS with poverty alleviation, see Annex 7.

Development Objective
The development objective refers to the smallholder livestock producers, but it is too early to see any clear impact by the project on key rural development goals, such as poverty reduction or food security in the country. The project has made significant progress with activities at Province level, which take the project closer to its ultimate beneficiaries.

The mission team has nevertheless considered that the issue could not be eluded, because of its relevance and its implication for the future of the Philippines's EAHMI or possible replication of the initiative in other countries. As a matter of fact, even the more field-oriented studies and surveys promoted and sponsored by the project (i.e. 'A GIS-aided study of environmental animal health and production in Laguna Province' and 'A GIS-aided study of integrated aquaculture and livestock/poultry production in the Philippines') fail in clearly linking the research carried out with any existing or possible field initiative addressing poverty-related and food security issues.

Project management is aware of this issue and is taking steps to address it before the end of the project. These steps include advocacy for smallholder-oriented, environmental animal health management practices in Laguna Province and outreach to remoter, less advantaged provinces in southern Luzon and Eastern Visayas.

6.2 Sustainability and environmental impact of results

Institutional sustainability is a major issue for the future of EAHMI. The EE has noted the great achievement of the project in terms of capacity building of the institutions involved. It has to be recognised, however, that increased consolidation is necessary before achieving full institutional sustainability.

Three major issues have a bearing on institutional sustainability:

1) the identification of the most appropriate institutional setting of GIS in the counterpart (BAI),
2) the linkages with other institutions inside DA, such as ITCAF, which have statistical and planning mandates, and
3) the maintenance and improvement of acquired technical capabilities (human resources) and equipment (hardware and software).

In connection with issue 1) above, the EE learned that the BAI has agreed to fund the ICTU from its regular budget (a sum equivalent to approximately USD 5 000 for the next financial year). This clear indication of GoP commitment to the ICTU has very positive implications for the sustainability of EAHMI, which appears to have a natural fit with the remit and activities of the ICTU.

6.3 Gender equity in project implementation

The balance of male and female participants in training courses was very good, with 13 women out of 28 trainees. There was no specific effort to promote gender equity in project implementation. Gender issues seem not having been raised during the training or data collection. The EE was not made aware of, for example, any effort by the project team to use sex-disaggregated data when considering smallscale livestock production.

There was no evidence that the project team had been given any briefing on gender issues. The high representation of women may merely reflect their status in institutions in the Philippines. For example, the staff of ICTU has 11 members of whom only four are men.

There is an obvious risk that women are sidelined in a development project of this nature unless specific effort is made to include them. There is awareness of this issue in wider development circles and in FAO, which has prepared briefing material for its field technical staff. *The EE considers that* FAO should have provided literature on gender issues in FAO project implementation as part of the briefing process for the CTA.

6.4 Cost-effectiveness

The EE found that the project has effectively used the resources at its disposal to provide the required outputs. Procurement has been prudent.

The care with which procurement has been carried out has contributed to the delay in procuring six more licensed copies of up-to-date ArcView GIS and Spatial Analyst software for project partner institutions and the project itself. It is available in the Philippines, but at high cost (USD 5 000) and from only one supplier (GeoData). Therefore, the project has found a way to achieve an alternative licensing arrangement with ESRI in the USA (unit cost USD 1 200 including Spatial Analyst, which would cost around USD 5 000 from GeoData). The very significant cost savings to the project make the delay worthwhile, though inconvenient in the short-term.

Open-source GIS software is available (see http://geonetwork.sourceforge.net). This has been demonstrated to project partners, but is not considered suitable, although it is cost-neutral. The reasons are: the open-source software may not do spatial analysis; the database associated with it lacks data from the Philippines; and it has been reported locally that it was difficult and slow to access the website. The project calls for GIS analysis and image analysis and not simple generation of choropleth maps, a map output based on statistics. The GIS output of the project could not be easily handled by other GIS software in the market today.

The reasons for using ArcInfo and ArcView in agriculture and NRM (Natural Resource Management) are, firstly, it is a widely used GIS software programme that contains both raster and vector-based modules for effective database analysis, management and visualization and menu-oriented integration of spatial and attribute data. Secondly, ESRI products are not only used by DA, but also by other Government organisations (Department of Health, National Statistical Office – NSO, National Economic Development Authority – NEDA, Department of Energy and Natural Resources – DENR, Department of Interior and Local Government – DILG,

Department of Public Works and Highway – DPWH, Philippines National Police – PNP, Philippine Institute of Development Studies – PIDS and others). Therefore, *the EE considers that* the purchase of commercial software outside the Philippines is the most cost-effective option.

6.5 Major factors affecting the project results

The project has shown impressive delivery of outputs, particularly in relation to Immediate Objective 1, in reduced time due to a combination of good management, a good project team and good administrative and technical backstopping by FAO. The project has benefited from being well designed with a comprehensive and logical link between activities and objectives in the ProDoc.

The project needs to achieve more in terms of influencing national policies and, thus, improving the livelihoods of smallholder livestock farmers. Its ability to achieve this was affected by the time constraint: indeed, what has been done was mostly done in two years although the project was planned over three years. This, in turn, was adversely affected by delay in the recruitment of the CTA.

Good linkages with partner institutions have been one reason for the concept of EAHM already being thought about in the Philippines. The great interest in training has also helped. In addition, there had been training before the project started and so it was able to capitalise on the skills and knowledge of people already trained in GIS who were working with partner institutions when the project began.

The project could have achieved even more had there been an information technology/ GIS/ remote-sensing specialist in the team. The lack of this person meant that follow-up on-the-job support to trainees was limited. The failure to recruit the APO described in the ProDoc contributed to this constraint.

In the latter stages of the project, the delayed procurement of additional, licensed, new versions of ArcView has affected full application of training in some field offices.

Training has focussed on GIS, but there is a need for initial emphasis on 'data mining' and database management.

The lack of comprehensive, reliable animal health data remains a constraint on the application of EAHMI as a tool for influencing animal disease control policy.

The project has not yet produced the output of maps that display in-depth analysis and provide impacts and influence policy decision-making (exceptions to this are the results of the commissioned studies). This constraint could only be addressed by long years of GIS experience augmented by regular attendance to training courses, seminars, and symposium. There are no shortcuts. There was a miss-match between the project time-frame, with a three-year implementation period, and the development time-frame required for not just enhancing institutional capacity in new concepts, but also applying them to influencing national policy. This development process will take longer, but overall the results are impressive in the time in which they were achieved.

7 Conclusions, Recommendations & Lessons Learned

7.1 Conclusions

The project was well justified in the Philippines rural development context. It fits well with the priorities of the donor, the host Government and FAO. The ProDoc comprises clear, logical design with a coherent development goal and immediate objectives. It focussed on the technical process and lacked sufficient detail on the participation of the ultimate beneficiaries. However, the project generated genuine interest for the further adoption of EAHM both in the Philippines and further afield. The project has also been a driver for the compilation of a more complete database for GIS in the Philippines.

The ProDoc plans for a three-year duration, but recognises that this may be insufficient. Project activities have been implemented within an operational period of only two years. More time is needed for the potential impacts of what has been achieved to be realised.

As a matter of fact, strong steps have been taken towards securing support for continuation of EAHM strategies. Informal discussions with the Government of Italy in the Philippines have taken place, preparing the way for submission of a full proposal. There was a Tripartite Review favourable to continuation of the project. Participants in the recent *International Workshop on GIS Applications in Animal Production and Health Animal Production and Health*, jointly hosted by EAHMI and the Animal Production and Health Commission for Asia and the Pacific (APHCA), unanimously agreed that further institutional strengthening and capacity building were required across the region. However, more work is needed to prepare a funding proposal.

The Draft Concept Note mentioned above envisages not only a Second Phase in the Philippines, but also the possibility of expanding the EAHM and GIS oriented approach to other countries of the sub-Region. Although the EE did not thoroughly discuss the possibility of expansion, a certain reticence from both the Philippines counterpart and the Italian Embassy has been perceived by the mission team.

Institutional sustainability is a major issue for the future of EAHMI. The EE has noted the great achievement of the project in terms of capacity-building of the institutions involved. At the time of the evaluation, however, it was too early in the process for the EE to detect significant impact on government policy by EAHM. Increased consolidation is necessary before achieving full institutional sustainability.

Although the project has made significant and interesting activities at Provincial level, the participation of the ultimate beneficiaries of the project, the smallholders, is a weak area of project implementation. The EE did not find any evidence of their active participation in assessments.

The EE concludes that the project has been implemented very efficiently. It has been well managed and outputs have been delivered efficiently and have resulted in the achievement of Immediate Objective 1, despite delay and the lack of the APO. There has been good support by the GoP and good FAO administrative and technical

support. There has been a good gender balance in the beneficiaries trained from the partner agencies, though more by chance than by planning.

The EE considers that the poverty focus of the project has been rather neglected to date. The development objective of the project refers to the ultimate beneficiaries, i.e. the smallholder livestock producers. It is conceptually beyond doubt (and proved in experiences elsewhere, e.g. tsetse fly/ trypanosomiasis control) that sound EAHM would highly benefit poor farmers and could be a powerful tool in addressing poverty reduction strategies. It is, however, currently too early to see in practice a clear and objective cause-effect connection between Philippines's EAHMI and main rural development goals, such as Poverty Reduction or Food Security in the country. The mission unanimously agreed that the project could not in any way be blamed for having "missed the point". On the contrary, the real and constant effort of the team for decentralising the activities of the project (such as inputs at Provincial level) should be interpreted as a genuine effort to get closer to the ultimate beneficiaries, the poor smallholders.

The project has gone a long way to promote GIS and the EAHMI concept within the decision-making institutions of the DA and build capacity in utilisation of the technology. At the time of the evaluation, there was not yet impact on policy, partly because the project was ambitious in its design (the ambitiousness of full achievement of all three Immediate Objectives in three years is acknowledged in the ProDoc Chapter B.4, paragraph 2) and partly because of delays (recruitment). Although the project has achieved a great deal in fulfilling its first Immediate Objective, it has not yet impacted as it could on policy and poverty alleviation. There is, therefore, a clear need to consolidate the process in a second phase of the project

7.2 Recommendations

Taking into account the short implementation period of this project, the main conclusions on project achievements and the sustainability concerns, the EE believes that a second three-year phase in the Philippines is imperative. The prospect also exists for expansion of the project to other countries of the sub-region. The EE is neither able nor mandated to analyse the feasibility of a regional option and, therefore, detailed recommendations for extension to other countries cannot be presented. However, the EE concluded that the results in the Philippines are sufficiently encouraging to test the protocol developed in the Philippines in other countries of the sub-region.

Specific recommendations regarding the future of EAHMI are grouped in this way:

- Recommendations on the continuity of the project,
- Recommendations on institutional linkages,
- Recommendations on technical staff,
- Recommendations on GIS position in EAHM and its suitable integration in poverty reduction strategies,
- Recommendations on standardisation of data collection and
- Recommendations on training.

The EE recommends that:

Recommendations on continuity of the project	To whom addressed
1. A funding proposal for Phase II in the Philippines should be urgently completed, with the project team and national stakeholders taking a lead role in its drafting.	FAO
2. Phase II should expand to more Provinces in the Philippines and include the priority regions covered by BAI-ICTU, that is, Regions 1, 3, 8 and 11, thus include the three major island groups, Luzon, Visayas and Mindanao.	FAO/GoP
3. A bridging mechanism should be identified to provide funds that maintain momentum from the end of the current project ("Phase I") to the beginning of the next ("Phase II").	FAO/donor
4. The Phase II project should not immediately include other countries in the sub-region, but in the early stages of implementation of the EAHMI Philippines Phase II project, technical staff should take a lead role in the formulation of a detailed funding proposal for a sub-regional EAHM project. Therefore, the design of the Phase II project should include time allocation and funding for their travel in the sub-region to potential partner countries to complete a sub-regional EAHM project appraisal.	FAO/donor
5. The project should organise more Regional workshops in Phase II to continue to develop wider interest and understanding of EAHM.	FAO
6. A sub-regional project, if approved and funded, should have its headquarters based in the Philippines, because this country is establishing unique expertise in the application of the novel EAHM approach and also has good transport links with regional hubs such as Bangkok and has reliable and efficient communication services.	FAO

Recommendations on institutional linkages	To whom addressed
7. The project should create stronger links with Government Departments additional to the Department of Agriculture. In particular, the Department of Environment and Natural Resources (DENR) and the Department of Health should have roles formalised in a future MoU.	FAO/GoP
8. SC membership should be broadened. Consideration and should be given to inclusion of ITCAF, DENR, DoH and the Planning and Policy Division of DA.	FAO/GoP
9. A wider range of stakeholders should participate in workshops, for example, the private sector, cooperatives, NGOs and/or extension services.	FAO/GoP

10. The linkage between EAHMI and the BAI-ICTU should be strengthened: a. The project should provide further technical and hardware support to ICTU as required. b. The project should continue to support the institutional strengthening of the ICTU. c. For at least two years, the project should support two full-time staff in ICTU responsible for database, GIS and systems administration and should seek GoP commitment for their longer-term employment.	FAO/GoP
11. The linkage between EAHMI and the Livestock Development Council (LDC), which has a key role in policy formulation, should be strengthened.	FAO/GoP
12. The linkage with the ITCAF, which holds the national information network, should be strengthened.	FAO/GoP

Recommendations on technical staff	**To whom addressed**
13. The project team should include a GIS/ IT/ RS specialist to deal with technical issues (data cleaning and database management) and provide follow-up guidance to newly trained persons. He/she could be national staff in the Philippines.	FAO
14. The BAI should appoint a full-time staff member as a project counterpart in any future phase. TOR for this post would include responsibilities as administrator, database manager and GIS specialist.	GoP

For background details on the EE's view on GIS position in EAHM and its integration in poverty reduction strategies, see Annex 7.

Recommendations on GIS in EAHM and poverty reduction	**To whom addressed**
15. Poverty indicators are given more prominence in the application of GIS to animal disease control.	FAO
16. Future studies and commissioned research should be more multidisciplinary, including rural development specialists (such as sociologists and economists), environmental impact specialists and should be more "action-research" oriented to fulfil the principles of people's participation and the holistic approach of EAHM.	FAO

Recommendations on data collection	To whom addressed
17. It is recommended that the project should continue to support the national system of data collection in line with changes planned to improve the system, including the pilot testing and roll-out of standardised data entry software.	FAO
18. More particularly, there needs to be standardisation of data collection and the compilation of a more comprehensive and more accurate database for GIS.	FAO/GoP

Improved data submission from the field to the BAI is essential for optimising the value of EAHMI in the Philippines. With regard to collection of animal disease and related data in the Philippines, specific recommendations for BAI-ICTU are presented in Annex 8. Many of these specific recommendations would be relevant for establishing EAHM in new countries.

Recommendations on training	To whom addressed
19. A thorough training needs assessment (TNA) is required.	FAO
20. Many more persons (to be quantified after the TNA) should be trained in GIS.	FAO
21. EAHMI GIS training should be divided into three major components, each lasting a week (see Annex 9 for details on the proposed content of this training).	FAO
22. To enhance the incorporation of the technology and EAHM into policy, executives should be offered training.	FAO/GoP

The EE's recommendations on training are presented in full in Annex 9.

7.3 EAHMI Phase II: objectives, major outputs and activities

The EE has been made aware of a Draft Concept Note: the draft, summarised project proposal *"Collaborative, sub-regional EAHMI for enhanced smallholder production in SE Asia"*. The EE notes that this draft document combines two components, a Philippines national component and a sub-regional component.

The EE is reticent about recommending immediate expansion into new countries prior to a formulation mission. The EE also is concerned that signature of a new sub-regional project by other host governments may delay starting the next phase in the Philippines. Other countries in the region may not be at the same starting point as the Philippines in terms of, for example, data availability and prior training in GIS: these factors could cause slower implementation than occurred in this project. More specific understanding of the status and requirements of new, target countries will be clarified during appraisal. New ProDoc(s) should avoid the temptation to be over-ambitious and, therefore, be unachievable in the project timeframe. Therefore, the EE

concludes that funding for the sub-regional programme should be sought while the Phase II project is underway in the Philippines.

The EE agrees, in general, with the development goal, objectives and outputs stated in the Draft Concept Note. The EE recommends that the next Project Document incorporates relevant elements of the detailed recommendations given in Section 7.2 of this report and also more detailed recommendations concerning GIS considerations, data collection and training, which have been consigned to the annexes to this report.

If it is agreed that the Philippines team takes the lead in appraisal for sub-regional expansion of EAHM, in the next ProDoc activities relating to appraisal for sub-regional expansion need to be defined in the framework of an appraisal exercise (rather than moving straight into implementation from the start of the new project in the Philippines, as proposed in the current Draft Concept Note). The EE believes the best qualified persons to assess the needs are the team who have led the development of EAHMI in the Philippines.

7.4 Lessons learned

The application of GIS in environmental animal health management was tested in this project and has generated considerable interest amongst animal health professionals and government decision-makers. The project in the Philippines, now near completion, has demonstrated that the technology is appropriate for application to animal disease control policy.

Experience in the Philippines has highlighted two general lessons that should be learned when the strategy is applied elsewhere:

1. Commercial software is much more appropriate for EAHM than readily available open-source software. Licensing issues need to be sorted out early in implementation, so that trained persons have access to the required software.
2. Although no gender concerns were raised during the EE and project activities had a good gender balance, FAO should, as a matter of principle, brief the implementing team on gender equity issues.

Annexes

Annex 1 Terms of reference

Independent Evaluation of the project *Environmental Animal Health to Redress Emerging Insect-borne and other Disease Constraints to Smallholders' Livestock Production* - GCP/PHI/050/ITA

Background

1. The Environmental Animal Health to Redress Emerging Insect-borne and other Disease Constraints to Smallholders' Livestock Production project, is an institutional strengthening and capacity building project that aims at promoting sustainable rural development through Environmental Animal Health Management (EAHM) for enhanced smallholders' livestock producers in the Philippines.

2. The three project immediate objectives are: A) Institutional strengthening and capacity building, B) EAHM strategy formulation and C) EAHM promotion and integration into national policies.

3. A core project component consists in developing a Geographic Information System (GIS) for environmental animal health management, and strengthening national capacity to: manage the system and expand its use as a decision making tool; analyse the environmental correlates of livestock resource distribution and disease incidence; map disease risks, define hot-spots of potential disease occurrence and environmental concerns; simulate the potential impacts of disease spread under various scenarios.

4. The project document foresaw a final project evaluation. In November 2007, at the Tripartite Review Meeting, it was agreed that before considering further funding beyond the current NTE and any additional budget, an independent evaluation should be carried out to formulate recommendations to the Government of the Philippines, the Government of Italy and FAO on the further steps necessary to consolidate progress and ensure achievement of objectives.

Purpose

5. The evaluation of the EAHM project is intended to provide recommendations to the Government of the Philippines, the Government of Italy and FAO on the further steps necessary to consolidate progress and ensure achievement of objectives. Any further need for external assistance will be identified.

6. The evaluation will be a comprehensive study of the project's activities, outputs and outcomes since project inception (September 2005) to date.

7. The evaluation will:

   i. assess whether the institutional capacity has been established in participating government livestock agencies, how it is being used and by whom, and its sustainability;

   ii. assess whether participants have improved their understanding of the environmental determinants of disease distribution and if this is conducive to the formulation of environmental animal health management strategies in support of smallholder livestock production;

   iii. assess whether environmental animal health management principles are being integrated in national livestock development policy and planning.

Scope

8. The evaluation will cover the following:

Relevance

- At the time of project design, the project's responsiveness to development priorities of the Governments of the Philippines and Italy and of FAO and appropriateness to the needs of the Philippines;

Project Design

- Quality of project design and logical consistency between, inputs, activities, outputs and progress towards achievement of objectives (quality, quantity and time-frame);
- Clarity and realism of the project's development and immediate objectives;
- Adequacy of targeting, for both direct and ultimate beneficiaries, namely the Philippines Government institutions and the smallholder livestock producers and consumers;
- Realism and clarity in the specification of preconditions, assumptions and risks, and their internalisation with further activities and/or commitments;
- Realism and clarity of external institutional relationships, and in the managerial and institutional framework for implementation;

Performance and implementation achievements

- timeliness of fund availability as compared with budget from both Italy and the Philippines;
- quality and timeliness of input delivery by FAO and the Philippines' Government;
- project managerial performance and work efficiency;
- adequacy of the project institutional setting and functioning of coordination between the Department of Agriculture's Bureau of Animal Industry (BAI) and the Philippine Carabao Centre (PCC), the National Dairy Authority (NDA), the Regional Field Units (RFU) in Regions III and IV, and the Governments of Laguna and Nueva Ecija Provinces;
- efficiency of the collaborations between the project and provincial veterinary officers and provincial agricultural statistics coordinators;
- adequacy of project monitoring and reporting;
- extent of national support and commitment;
- quality and quantity of administrative and technical support by FAO.

Results (outputs/outcomes)

- full and systematic assessment of outputs produced to date in terms of both quantity and quality, as compared with annual work-plans and budgets;
- progress towards achieving the three project immediate objectives. The mission will especially review the status and quality of work on:
    i. Institutional/capacity building and human resource development, a high priority of the project. These should be responsive to the needs of the project partners and collaborating institutions, namely the BAI-ITCU, PCC, NDA, DAs-RFUs and government staffs in Laguna and Nueva Ecija Provinces;

ii. Effectiveness in assisting the national collaborating institutions and partners to achieve enhanced understanding of statistics and database management at national and local levels;

iii. Perspectives of incorporation of EAHM principles in academic curricula of Philippines Universities;

iv. Dissemination of lessons learned and project-produced policy briefs at national and regional levels;

v. Effectiveness of policy-advocacy induced by studies produced by the project;

vi. Establishment of links/exchanges of experience with WHO and OIE on veterinary and human health issues, such as environmental pollution from intensive livestock production activities near urban areas (animal waste disposals), impact on agricultural landscapes (overgrazing), socio-economic imbalances between industrial and smallholder producers, and animal and veterinary public health hazards;

vii. Quality of the functioning of the collaborations between the animal health services and those responsible for implementing the regulatory controls for foods of animal origin to ensure safe food and consumer protection;

viii. Effectiveness and accuracy of data collection at provincial level on disease occurrence (in particular Surra, Fasciola, Hemorragic Septicemia and Food and Mouth Disease in carabaos, cattle, pigs and horses) to feed the EAHM databases, by provincial veterinary and agricultural statistics officers;

ix. Effects in policy making to date of the project-induced discussion on the links between poverty, environmental risks, animal disease and livestock production, based on the integration between the poverty map and other technical layers produced by the project;

x. extent, adequacy and effectiveness of gender issues mainstreaming in project activities;

xi. Performance of the established communication network and the effectiveness of information updating, sharing and data harmonization between the stakeholders involved.

- Cost-effectiveness of the results achieved to date, in particular by considering options like the switch from commercial GIS to open-source GIS software.

Sustainability

- Prospects for sustaining the project's results by the beneficiaries and the host institutions after the termination of the project. The mission should examine in particular the institutional, environmental and technical sustainability of the results achieved to date, and the continuity of trained personnel in BAI-ICTU and in the partner institutions (PCC, NDA, DAs-RFUs, etc.).

9. Based on the above analysis the evaluation will draw specific conclusions and make proposals for any necessary further action by Government of the Philippines, FAO and the Government of Italy to ensure sustainability of project results. This includes an assessment of if and how a continuation of project activities should be pursued in a second phase. Any proposal for further assistance will include precise specification of objectives/outcomes and the major suggested outputs and inputs.

Methodology

10. The main evaluation techniques will include, but are not limited to: desk reviews, data gathering and desk studies; key informant interviews to gather expert

views on the system and the quality of the outputs it produces; semi-structured interviews / focus groups with project stakeholders; field observations.

11. A pre-evaluation questionnaire will be prepared by the Evaluation Service and sent out before fielding the evaluation mission, with the assistance of the project for the recipients' mailing list[3]. This is intended to gather the views of the immediate beneficiaries of the project, namely the staff of the DAs, BAI, NDA, PCC and participating LGUs and DE-Regional Offices, as trainees and direct users of the EAHM GIS system. A similar questionnaire will be prepared and sent out to policy making bodies, namely the National Advisory Committee on Animal Disease Control and Emergency (NACADCE), the Special Projects Coordination and Policy Assistance Division (SPCMAD) and the Philippine Council for Agriculture and Resources Research and Development (PCARRD).

12. Triangulation will be applied to verify and validate findings.

13. The FAO Evaluation Service will manage the evaluation and will be responsible for quality control[4].

Expertise required

14. The evaluation team will combine among its members the following fields of expertise:

- Veterinary, with expertise in veterinary policy for insect-borne animal diseases;
- Remote Sensing & Geographic Information Systems (RS & GIS);
- Capacity/institution building;
- Evaluation.

15. The model of a tripartite mission representing the donors, FAO and the country(s) is being replaced by the concept of an independent team with composition and TORs agreed by all parties[5].

16. The team will consist of three members who should be independent and thus have no previous direct involvement with the project either with regard to its formulation, implementation or backstopping.

17. Each team member should have at least ten years of professional experience; work experience in South-East Asian countries; wide knowledge of the Philippines context and of environmental management for animal health control would be an added advantage. All team members must be fluent in English (written and oral).

Indicative timetable and itinerary

18. The mission will take place in March 2008, for a minimum of 2 weeks. At least one mission member, possibly the evaluation Team Leader, will visit the FAO in Rome and in the Regional Office in Bangkok (RAP) to be briefed by headquarters and regional officers, members of the project task force.

19. The team members will assemble in Manila, where they will be briefed by the FAO Representation, the Project and national stakeholders. The mission will include field visits in Nueva Ecija Province and Laguna SDA South Luzon Province. A

[3] The despatch and receipt of replies will be done from the FAO Evaluation Service.
[4] Evaluation in FAO, Institutional arrangements, policies and methods, FAO 2007 (§ http://www.fao.org/pbe/pbee/common/ecg/318/en/InstitutionalArragementsNov2007EN.doc, paragraph 11).
[5] Ibid.

detailed work plan will be proposed by the Project, to be agreed with the Evaluation Service and the Team Leader.

20. The mission will maintain close liaison with the representatives of the donor, FAO and the concerned national agencies, as well as with national and international project staff. Although the mission should feel free to discuss with the authorities concerned anything relevant to its assignment, it is not authorized to make any commitments on behalf of the Government, the donor, or FAO.

Reporting

21. A preliminary aid-memoir will be presented at a de-briefing meeting to be held in Manila with all stakeholders before the team's departure from the country and finalised afterward. The final draft will be circulated to all stakeholders within the country and FAO within two weeks from the end of the mission and finalised following receipt of comments within further two weeks.

22. Final responsibility for all the reports rests with the evaluation Team Leader. However, the final evaluation report should reflect the conclusions of the evaluation team as a whole. The Team Leader will also complete the FAO Project Evaluation Questionnaire.

23. The mission is fully responsible for its independent report which may not necessarily reflect the views of the Government of the Philippines, the Government of Italy or FAO.

Annex 2 List of places visited and key persons met by the mission

FAO HQ Rome 09-Apr-08

- Jan Slingenbergh, Senior Animal Health Officer, AGAH
- Raffaele Mattioli, Animal Health Officer (Integrated Health Management) and contact for the project's Lead Technical Unit, AGAH
- Aleksander Zaremba, Senior Programme Officer, TCAP and Funding Liaison Officer of the project
- Pietro ChiappiniCarpena, Programme Officer, TCAP
- Tullia Aiazzi, Evaluation Officer, PBEE

FAO RAP Bangkok 11-Apr-08

- Carolyn Anne C Benigno, Animal Health Officer & member of Project Task Force
- Sumiter Broca, Policy Officer [telephone meeting], deputizing for Nanae Yabuki, member of the Project Task Force
- Nancy Morgan, Livestock Policy Officer

FAO Manila 14-Apr-08

- Kazuyuki Tsurumi, FAO Representative
- Arcadio L Cruz, Assistant FAO Representative (Programme)
- David M Bourn, Chief Technical Adviser (GCP/PHI/050/ITA)
- Jose Q Molina, Senior Environmental Animal Health Officer/ National Consultant (GCP/PHI/050/ITA)
- Rubina O Cresencio, Chief Livestock Development Division/ National Project Coordinator (GCP/PHI/050/ITA)
- Samoa Perucca, Programme Officer/ UN Fellow

Embassy of Italy 14-Apr-08

- Mario Bartoli, First Secretary

Santa Cruz, Laguna Province 15-Apr-08

- Valentin P Guidote, Provincial Planning and Development Coordinator
- Ariel Penaranda, Planning and Development Officer
- Mary Grace Bustamante, Provincial Veterinary Officer
- Froilan Mang Fred Garcia, Farmer (laying ducks, pigs and *carabao*) Santa Cruz
- Virgilio Angeles Mabilangan, Farmer (dairy herd), Santo Tomas, Batangas
- Gabriel Lagamayo, Field Officer, National Dairy Authority

University of the Philippines, Los Baños 16-Apr-08

- Conrado A Valdez, Dean & Professor, College of Veterinary Medicine
- Maria Victoria O Espaldon, Dean & Associate Professor, School of Environmental Science and Management (SESAM)
- Cesar C Sevilla, Professor & Director, Animal and Dairy Sciences Cluster, College of Agriculture
- Antonio J Alcantara, Professor & former Dean of SESAM
- Michelle V Paraso, Professor and Study Leader (Aquatic Ecotoxicology)
- Corazon Calimag, Director, Training Centre for Tropical Resources and Ecosystems Sustainability (TREES)

Department of Agriculture, Quezon City 17-Apr-08
- Davinio P Catbagan, Director, Bureau of Animal Industry (BAI) and EAHMI National Project Director
- Victor C Atienza, Assistant Director BAI
- Rene Manantan, Director, Special Projects Coordination, Monitoring and Assistance Division, Department of Agriculture (DA)
- Ronald Salunga, Director, Information Technology Centre for Agriculture and Fisheries (ITCAF), DA
- Joel Abunda, Consultant, ITCAF, DA
- Marcia Lanuza, Project Evaluation Officer, Programme Monitoring and Evaluation Division, Livestock Development Council (LDC), DA
- Vincent Chua, Agriculturalist, Planning and Programming Division, LDC, DA
- Nanette Yanson, Head of Livestock Section, Bureau of Agricultural Research (BAR), DA
- Rafael Umbrero, GIS Specialist, BAR, DA
- Naomi K Torreta, Officer-in-Charge, National Dairy Authority, DA
- Alice Berba, Member, Information Technology Communications Unit (ICTU), DA
- Marites Gealone, GIS Specialist, Livestock Development Division
- Percival Gealone, Systems Administrator, BAI Local Area Network (LAN)
- Teodulo M Topacio, Chairman National Advisory Committee for Animal Disease Control and Emergency (NAC-ADCE)

Embassy of Italy 18-Apr-08
- His Excellency Rubens Anna Fedele, Ambassador of the Republic of Italy

Philippine *Carabao* Centre (PCC) 21-Apr-08
- Libertado C Cruz, Executive Director, PCC
- Nancy Abes, Veterinarian & EAHMI Coordinator, PCC
- Jerome M Balaoing, GIS Specialist, PCC
- Charito A Gutierrez, Assistant EAHMI Coordinator, PCC
- J Capiral, Computer Specialist, PCC

Central Luzon State University (CSLU) 21-Apr-08
- Jose S Abucay, Professor, College of Fisheries
- Armando Espino, Director, Water Resource Management Centre
- Nicasio C Salvador, Specialist, Water Resource Management Centre
- Reginaldo Abuyuan, Professor, College of Veterinary Science and Medicine (CVSM)
- Victoria M Venturina, Professor, CVSM
- Virginia M Venturina, Professor, CVSM
- Antonio J Barroga, Professor, CVSM
- Clarissa Domingo, Professor, CVSM
- Noraine Medina, Professor, CVSM

Provincial Veterinary Office, Nueva Ecija 21-Apr-08
- Jenny M Averilla, Provincial Veterinarian
- Lorimee T Bello, GIS Specialist
- Celina C Puno, Computer Specialist

Nueva Ecija Province, Farm Visit 21-Apr-08

- Marcelino L Mislang, *Carabao* farmer and Member of Board of Directors NEFEDCCO

Nueva Ecija Federation of Dairy *Carabao* Cooperatives (NEFEDCCO), Buffalo Milk Collection and Processing Centre 21-Apr-08

- Nestor F Alvarez, Member of Board of Directors NEFEDCCO

Nueva Ecija Province, Mapanpang, Muñoz, Farm Visits 21-Apr-08

- Farmers, mixed rice, pigs and poultry producers
    - Romy Vendevil, free-range chickens
    - Prudencio Reyes, piggery

Candaba Swamp, Pampanga Province, Farm Visits 22-Apr-08

- Pig Farmers, Mandasig, Candaba, Integrated fish (*Tilapia*) and pig producers
    - Zosimo Estacio, two fattening units over *Tilapia* ponds
    - Ramon Macalino, breeder unit (one boar, eight sows)

Department of Agriculture Regional Field Unit no. 3 (DA-RFU 3), San Fernando, Pampanga 22-Apr-08

- Redentor S Gatus, Regional Executive Director, DA-RFU 3
- Eduardo L Lapuz, EAHMI Coordinator, DA-RFU 3
- Jose Isagani A Herrera, GIS Specialist, DA-RFU 3

Annex 3 List of documents and other reference materials consulted by the mission

- Project Document
- Press Note (regarding signing of the Project Document). FAOR-Philippines, 2005.
- Memorandum of Understanding , 17-May-06 *Signatories*: Bureau of Animal Industry, Philippine *Carabao* Centre, National Dairy Authority, Regional Field Unit III, Regional Field Unit IV, Province of Nueva Ecija, Province of Laguna. *Witnessed by*: Under-Secretary for Livestock and Fisheries, Ambassador of the Republic of Italy, FAO Representative.
- Inception Report
- Minutes – Project Launching and First Steering Committee Meeting
- Minutes – Steering Committee Meeting, 16-Feb-07
- Minutes – First Tripartite Review Meeting, 09-Nov-07
- Thumbnail Introduction to the Philippine Environmental Animal Health Management Initiative to FAO's External evaluation Mission. D Bourne, CTA, Apr-08.
- Project Briefer – Environmental Animal Health Initiative. EAHMI, 2007.
- Project Progress Reports
    - January to February 2006
    - September 2006 to February 2007
    - March to August 2007
    - September 2007 to February 2008
- Quarterly Project Implementation Reports
    - 1st Quarter 2006
    - 2nd Quarter 2006
    - 3rd Quarter 2006
    - 4th Quarter 2006
    - 1st Quarter 2007
    - 2nd Quarter 2007
    - 3rd Quarter 2007
- Back-to-Office Report (BTOR) – Raffaele Mattioli and Jan Slingenbergh, Philippines – July, 2006.
- Back-to-Office Report (BTOR) – Raffaele Mattioli, Philippines – March, 2007.
- Back-to-Office Report (BTOR) – Raffaele Mattioli, Philippines – November, 2007.
- Back-to-Office Report (BTOR) – Pietro Chiappini Carpena, Philippines – November, 2007.

- Consultant Report: Spatial Analysis of Selected Livestock and Animal Disease Distributions in the Philippines, Step III Multivariate Distribution Modelling. W Wint, Nov-07
- A GIS-Aided Study of Environmental Animal Health and Production in Laguna Province, Philippines – Synthesis Report. SESAM, University of the Philippines, Los Baños, Jan-08. (Funded through project LoA.)
- Surra (*Trypanosoma evansi*): A Review of the Current State of Knowledge in the Philippines, V M Venturina *et al*, Feb-08. (Funded through project LoA.)
- A GIS-Aided Study of Integrated Aquaculture and Livestock/Poultry Production in the Philippines. A N Espino *et al*, Mar-08. (Funded through project LoA.)
- National Dairy Authority: Annual Report 2006.
- GIS in the Philippines – Principles and Applications in Forestry and Natural Resources. N C Bantayan, 2006. (An adjunct to training written by one of the trainers of TREES, contracted by EAHMI to provide GIS training.)
- TREES: International Training Courses 2008 – 2009.
- The College of Agriculture AgriPark: A Joint Project of UPLB College of Agriculture and Dept of Agriculture Agricultural Credit and Policy Council.
- Review of FAO/Italy Agricultural Development Projects 2006. FAO/Government of Italy Cooperative Programme. FAO 2006.
- Panel Meeting on Surra – Draft proceedings. EAHMI, May-08
- On Target Against Poverty – The Programme Against African Trypanosomiasis 1997-2007. FAO, 2008.
- Policy Brief on Animal Disease Distribution Modelling and Risk Mapping in the Philippines: Liver Fluke and Surra. EAHMI, 2008.
- National Advisory Committee for Animal Disease Control and Emergency (NAC-ADCE) – Accomplishments
- NAC-ADCE – Functions and Members of the Committee
- Manual for the Field Diagnosis of Common Livestock and Poultry Diseases in the Philippines (PowerPoint presentation), J Q Molina, Feb-08
- Changing Lives: Beyond the Draft *Carabao*. S M Pablico. Philippines *Carabao* Centre (PCC), 2006
- Milking Profits from the *Carabao*. BAR Digest – Official Publication of the Bureau of Agricultural Research, Sep-06
- Creation of an Information and Communications Technology Unit (ICTU) of the BAI – Special Order no. 45. BAI, 10-Jul-06.

Annex 4 List of main outputs of the EAHMI project

This summary was compiled by the CTA and covers the operational period Jan-06 to Apr-08.

Technical Support to BAI's Information Communication Technology Unit

Procurement of

- network server,
- back up power supply,
- air-conditioners and
- Geographical Information System software (ESRI ArcGIS 9.2 and Spatial Analyst).

New GIS Hybrid Administrative Boundary Map of the Philippines, incorporating both old NSO and new standard NSCB geocodes.

Acquisition, Compilation and Distribution of GIS Data

- Administrative boundary and environmental data layers from the Bureau for Agricultural Research and International Rice Research Institute
- Animal disease data from the Bureau of Animal Industry
- Livestock and poultry data from the Bureau of Agricultural Statistics
- Human census and socio-economic data from the National Statistics Office
- Digital elevation data from Consultative Group for International Agricultural Research
- LANDSAT imagery from Food and Agriculture Organization of the United Nations
- MODIS imagery and derivatives from Environmental Research Group Oxford.

Policy Development Working Papers and Policy Briefs

EAHMI (2008 a). Working paper on animal disease distribution modelling and risk mapping in the Philippines: Fasciolosis (Liver fluke) Quezon City: Environmental Animal Health Management Initiative**:** pp18. January 2008.

EAHMI (2008 b). Working paper on animal disease distribution modelling and risk mapping in the Philippines: Trypanosomosis (Surra) Quezon City: Environmental Animal Health Management Initiative**:** pp20. January 2008.

EAHMI (2008 d). Policy brief on animal disease distribution modelling and risk mapping in the Philippines: Liver Fluke and Surra. Quezon City: Environmental Animal Health Management Initiative**:** pp4. February 2008.

EAHMI (2008 j). Draft proceedings of panel meeting on Surra (*Trypanosoma evansi*) in the Philippines, 3 April 2008. Quezon City: Bureau of Animal Industry, Environmental Animal Health Management initiative. April 2008.

EAHMI Webpage and CD-ROM

Webpage on Bureau of Animal Industry Website:
http://www.bai.ph/eahmi/default.html

Commissioned Studies

- University of the Philippines at Los Baños, School of Environmental Science and Management: *GIS-aided study of environmental animal health and*

production in Laguna Province, Philippines, contracted by Letter of Agreement with FAOR, Philippines.

- Central Luzon State University, College of Veterinary Medicine and University of Southern Mindanao: *Collaborative technical review of the current state of knowledge about Surra (Trypanosoma evansi) in the Philippines,* contracted by Letter of Agreement with FAOR, Philippines.
- Central Luzon State University, College of Veterinary Medicine, College of Veterinary Medicine: *Review and synthesis of current state of knowledge about animal production and disease constraints in and around the Candaba Wetlands, Central Luzon, Philippines,* contracted by Letter of Agreement with FAOR, Philippines.
- Central Luzon State University, College of Fisheries: *A GIS-aided study of integrated aquaculture and livestock/poultry production in the Philippines,* contracted by Letter of Agreement with FAOR, Philippines.
- Environmental Research Group Oxford: *Remote sensing, image processing, multivariate analysis and predictive mapping of animal resource and disease distributions in the Philippines,* contracted through FAO Bangkok, with approval of AGAH, Rome.

Outreach and Advocacy Seminars and Presentations

- 27-Sep-07: Presentation on *"Environmental Animal Health Management Initiative"* to the Livestock Development Council, Department of Agriculture. c15 participants.
- 20-Nov 07: Guest Speaker: "*Philippine Environmental Animal Health Management Initiative: GIS applications in animal production and health"*. Southeast Asian Regional Centre for Graduate Study and Research in Agriculture (SEARCA), University of the Philippines at Los Baños, Laguna. Audience: c30.
- 9 Nov-07: Guest Resource Speakers on: *"Philippine Environmental Animal Health Management Initiative: national perspectives and regional prospects;" "Emerging livestock and poultry diseases in southeast Asia"* and *"Environmental vulnerabilities and adaptation of swine and poultry farming in the Philippines"* at International Training course on "Livestock and Environment Interaction: Transition to Sustainable Livestock Production Systems" hosted Wageningen International and School of Environmental Science and Management, University of the Philippines Los Baños, Laguna. Audience: c75.
- 29-Oct-2-Nov-07: Invited presentation on *"Philippine Environmental Animal Health Management Initiative: GIS applications in animal production and health"* at 31st Session of the Animal Production and Health Commission for Asia, Regional Workshop on Livestock Management in Emergencies, Chiang Mai, Thailand. c15 participants from APHCA member countries: India, Indonesia, Lao PDR, Sri Lanka and Thailand.
- 20-Dec-07: Presentation of *"Summary of animal disease modelling and risk mapping in the Philippines"* to the National Advisory Committee on Animal Disease Control and Emergency (NACADCE), Bureau of Animal Industry.

- 12-Jan-08: Presentation and distribution of working papers on animal disease distribution modeling and risk mapping in the Philippines: Fasciolosis (Liver fluke) and Trypanosomosis (Surra) to the Bureau of Animal Industry's Animal Health Division.
- 23/25-Jan-08: Outreach briefings to Department of Agriculture's Regional Field Unit I Tuguegarao, Cagayan Province and RFU II, San Fernando, La Union, as potential partners for EAHMI phase II.
- 21-Feb-08: Plenary presentation to the Philippine Veterinary Medical Association, Annual Convention and Scientific Conference on Animal disease risk modeling and risk mapping in the Philippines,
- 27-Feb-08: Distribution of draft policy brief on animal disease distribution modeling and risk mapping in the Philippines.

Set of Wall Posters of Environmental Conditions, Livestock and Poultry Resources and Animal Diseases in the Philippines

1. **Elevation** - Consultative Group for International Agricultural Research;
2. **Land Surface Temperature** - Environmental Research Group Oxford and Spatial Ecology and Epidemiology Group, Oxford University;
3. **Land Cover 2003** - National Mapping and Resource Information Agency;
4. **Enhanced Vegetation Index** - Environmental Research Group Oxford and Spatial Ecology and Epidemiology Group, Oxford University;
5. **Seasonality** – Environmental Research Group Oxford and Spatial Ecology and Epidemiology Group, Oxford University;
6. **Carabao (buffalo)** - Bureau of Agricultural Statistics;
7. **Cattle** - Bureau of Agricultural Statistics;
8. **Hogs/Pigs/Swine** - Bureau of Agricultural Statistics;
9. **Commercial Percentage Hogs/Pigs/Swine** - Bureau of Agricultural Statistics;
10. **Foot and Mouth Disease** - Bureau of Animal Industry;
11. **Surra (*Trypanosoma evansi*)** - Bureau of Animal Industry;
12. **Fasciolosis (Liver Fluke)** - Bureau of Animal Industry;
13. **Hemorrhagic Septicaemia** - Bureau of Animal Industry;
14. **People (2,000 Census)** – National Statistical Office;
15. **Poverty Incidence** – National Statistical Coordination Board.

Project Reports, Working Papers and Policy Briefs

EAHMI (2006 a). Inception report. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp13. August 2006.

EAHMI (2006 b). Familiarization workshop on the use of the Animal Disease Information Management System (ADIMS), Global Positioning System (GIS) and Geographical Information System (GPS). Philippine Carabao Center, Muñoz City, Nueva Ecija. D. M. Bourn, R. O. Cresencio, M. C. Gealone and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative. 16 August 2006.

EAHMI (2006 c). Familiarization workshop on the use of the Animal Disease Information Management System (ADIMS), Global Positioning System (GIS) and Geographical Information System (GPS). Provincial Veterinary Office, Santa Cruz, Laguna. D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative. 23 August 2006.

EAHMI (2006 d). GIS capacity and training needs assessment. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp10. September 2006.

EAHMI (2006 e). Provisional catalogue of spatial data on animal diseases, livestock resources, environmental conditions and socio-economic indicators in the Philippines. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp27 + Appendix pp27 December 2006.

EAHMI (2007 a). Interim atlas of livestock resources, people and poverty in the Philippines. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp22. January 2007.

EAMHI (2007 b). Interim report on animal disease and livestock related spatial data: Laguna Province, Region IV, Southern Tagalog, Philippines. M. G. M. Bustamante, M. E. Evangelista and A. P. Penaranda. Santa Cruz, Laguna Province: Provincial Veterinary Office**:** pp17. January 2007.

EAMHI (2007 c). Interim report on animal disease and livestock related spatial data: Nueva Ecija Province, Region III, Central Luzon, Philippines. J. M. Averilla, L. Thomas, C. Puno and J. I. Herrera. Palayan City, Nueva Ecija Province: Provincial Veterinary Office**:** pp14. January 2007.

EAMHI (2007 d). Interim report on animal disease and livestock related spatial data for Region III, Central Luzon, Philippines. E. L. Lapuz and J. I. Herrera. San Fernando, Pampanga: Department of Agriculture Regional Field Unit - III**:** pp4. January 2007.

EAMHI (2007 e). Interim report (PowerPoint presentation) The Philippine Carabao Centre's Enterprise Development Program in Nueva Ecija.. N. Abes and J. Balaooing. Science City of Munos: Philippine Carabao Centre**:**. January 2007.

EAHMI (2007 f). Preliminary assessment of the frequency and distribution of animal disease field records in the Philippines: 1997-2004. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp26. March 2007.

EAHMI (2007 g). Updated Work Plan for the Environmental Animal Health Management Initiative. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp6. March 2007.

EAHMI (2007 h). Interim atlas of livestock resources in Region VII of the Philippines by City/Municipality: CY 2002. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp22. June 2007.

EAHMI (2007 i). Preliminary assessment of laboratory animal disease data: CY 2005. D. P. Catbagan, D. M. Bourn, R. O. Cresencio and J. Q. Molina. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp23. June 2007.

EAHMI (2007 j). Distributions of laboratory confirmed cases of fasciolosis and trypanosomosis: 2001-05. M. Cruz, S. Sison and D. M. Bourn. Quezon City, Metro Manila, Philippines: Bureau of Animal Industry, Environmental Animal Health Management Initiative (GCP/PHI/050/ITA)**:** pp20. June 2007.

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Annex 5 PBEE's pre-evaluation questionnaire on institutional strengthening/ capacity building

Date(s): _____ Place: _____

Training event: of
Course ☐ Workshop/ Presentation ☐ On-the-job training ☐ Training trainers ☐

Benefiting Agency:
BAI-ICTU ☐ NDA ☐ PCC ☐
CLSU ☐ MUSCA ☐
Nueva Ecija Province LGU ☐ Laguna Province LGU ☐

Trainers:_____

Topics covered:_____

Rapid assessment

Evaluation criteria	very unsatisfactory	well below average	slightly below average	slightly above average	well above average	very good
1. Relevance to my daily work of the topics covered by the training event						
2. Performance improvement in my daily work thanks to the training event						
3. Career perspectives after the training event						
4. Quality of the didactic material distributed (documents, slides, etc.)						
5. Quality of the training methodology, including the balance "theory/group work"						
6. Quality of the training delivery, including active participation of the trainees						
7. To what extent my expectations have been met						
mark with an X the case corresponding to your appreciation	always	very often	often	sometimes	rarely	never

8. How often do I consult the training material after the training event						
9. How often do I have to consult other material related to this topic in my work						
10. Duration of the event	too long	well above average	slightly above average	slightly below average	well below average	too short

Detailed comments

Please provide further information in relation to the relevance and usefulness of the training event to your work. Having applied what you learned in carrying out your tasks every day,

A) What was good of the training?

B) What could be improved?

Information on the respondent

Role/position in your agency:

_____

Optional

Name:

_____

Administrative address:

_____

THANK YOU!

Annex 6 Summary of awareness-raising and training activities in the EAHMI project

Activity	Duration & Date	Institution	Location	Target	N. Part.
1) GIS / GPS & EAHMI Awareness Raising & Familiarization					
Introductory Workshop	One-day Aug 06	EAHMI	Muñoz (Nueva Ecija)	BAI & EAHMI Partners	28
Introductory Workshop	One-day Aug 06	EAHMI	S. Cruz (Laguna)	BAI & EAHMI Partners	13
Poster presentation on EAHMI	Oct. 06	EAHMI	Italy	First international conference on GIS use in veterinary services (OIE)	na
Presentation on "Environ. impacts of animal production"	Mar 07:	EAHMI	PCC (Philip. Carabao Centre) Muñoz, Nueva Ecija	Symposium on Livestock Biotechnology,	75
Presentation on "Environmental Animal Health Management Initiative (EAHMI): status and prospects".	May 07:	EAHMI	Zamboanga City, Mindanao	Fifth Annual Seminar/Workshop and Conference of the Provincial, City and Municipal Veterinarians League	25
Presentation of the progress report on preliminary analysis of MUSCA data (Mindanao Unified Surra Control Approach).	Jul 07:	EAHMI	Davao City - Mindanao	Workshop hosted by Department of Agriculture, Regional Field Unit XI, Mindanao.	10
Fifteen large posters of animal resources, diseases and environmental conditions in the Philippines	Aug 07	EAHMI	Different locations	Wall display in the Philippine Animal Health Centre, workshops and forthcoming GIS conference.	na
Presentation of extended findings of previous studies and promotion of further activities.	Sept 07	EAHMI	Davao City - Mindanao	Workshop organized by the Australian Centre for International Agricultural Research and the Mindanao Unified Surra Control Approach (MUSCA)	20

Presentation of findings of GIS-aided study of environmental animal production and health in Laguna Province and demonstration of the utility of GIS technology	Sept 07	EAHMI	School of Environmental Science and Management, University of the Philippines at Los Baños, Laguna.	Stakeholder workshop	40
Presentation on "Environmental Animal Health Management Initiative"	Sept 07	EAHMI	Dept. of Agr.	Livestock Development Council, Department of Agriculture	15
Presentation on "Philippine Environmental Animal Health Management Initiative: GIS Applications in animal health and production"	Oct 07	EAHMI	Manila	Annual GIS User Conference "GIS: The Geographic Advantage"	30
Invited presentation on "Philippine Environmental Animal Health Management Initiative: GIS applications in animal production and health".	Nov 07	EAHMI	Thailand	31st Session of the Animal Production and Health Commission for Asia, Regional Workshop on Livestock Management in Emergencies. (participants from APHCA member countries: India, Indonesia, Lao PDR, Sri Lanka and Thailand)	15
Presentation on "Philippine Environmental Animal Health Management Initiative: GIS applications in animal production and health". (Guest speaker)	Nov 07	EAHMI	University of the Philippines Los Baños, Laguna.	Southeast Asian Regional Centre for Graduate Study and Research in Agriculture (SEARCA)	30

Three Presentations: "Philippine Environmental Animal Health Management Initiative: national perspectives and regional prospects"; "Emerging livestock and poultry diseases in southeast Asia"; "Environmental vulnerabilities and adaptation of swine and poultry farming in the Philippines" (Guest Res. Speakers)	Nov 07	EAHMI	University of the Philippines Los Baños, Laguna.	International Training course on "Livestock and Environment Interaction: Transition to Sustainable Livestock Production Systems" hosted Wageningen International and School of Environmental Science and Management,	75
Presentation on production of an ungraded, hybrid map of barangay administrative boundaries.	Dec 07	EAHMI	BAI Conference Room.	BAI staff	15
Presentation of "Summary of animal disease modelling and risk mapping in the Philippines"	Dec 07	EAHMI	BAI	Members of the National Advisory Committee on Animal Disease Control and Emergency (NACADCE)	15
Outreach briefing on "Department of Agriculture's Environmental Animal Health Management Initiative"	Jan 08	EAHMI	Tuguegarao - Cagayan Prov.	Regional Field Unit I, , Cagayan Province.	50
Outreach briefing on "Department of Agriculture's Environmental Animal Health Management Initiative"	Jan 08	EAHMI	San Fernando	Regional Field Unit II San Fernando La Union, Province.	30
Invited plenary presentation on "Animal disease risk modelling and mapping for environmental animal health management in the Philippines"	Feb 08	EAHMI	Boracay, Aklan	Philippine Veterinary Medical Association (PVMA) 75th Annual Convention and Scientific Conference,	80
Presentation of the Paper: "Manual for field diagnosis of common livestock and poultry diseases in the Philippines"	Feb 08	EAHMI	Boracay, Aklan	Philippine Veterinary Medical Association (PVMA) 75th Annual Convention and Scientific Conference	40

2) GPS / GIS Basic Training	Duration & Date	Institution	Location	Target	N. Part.
Use of GPS	One-day Sept 06	De Leon	Quezon City	BAI & EAHMI Partners	21
Course: "Introduction to GIS"	5 days Nov 06.	NAMRIA (Nat. Mapping and Resource Information Agency)	Manila	BAI & EAHMI Partners	15
Seminar on remote sensing and Geographical Information System applications in environmental animal health	One-day Apr 07:	EAHMI	BAI – Quezon City	Staff of BAI (Bureau of Animal Industry)	50
Workshop on "Factors influencing the distribution of livestock, poultry and animal diseases in the Philippines"	One-day June 07	EAHMI	BAI – Quezon City	Staff of BAI	18
Intensive GIS course: "Introduction to ArcGIS 9.x with extensive hands-on sessions."	Three-day Dec 07	GEODATA	Manila	BAI & EAHMI Partners	7
International Workshop on "GIS Applications in Animal Production and Health"	Five-day March 08	EAHMI / BAI / APHCA	Quezon City	Representative of fourteen APHCA states (Bhutan, India, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Papua NG, Philippines, Samoa, Sri Lanka, Thailand)	14

3) Advanced Application Skills and Knowledge	Duration & Date	Institution	Location	Target	N. Part.
International workshop on "Transition to sustainable production systems: Livestock and Environmental Interactions and the future of Animal Production"	Dec 06	SESAM (School of Environmental Science and Management - University of the Philippines) and Wageningen International.	University Los Baños	BAI & EAHMI Partners	11
Course on "Remote Sensing and GIS Applications for Environmental Animal Health Studies"	Two weeks Apr 07:	TREES (Training Center for Tropical Resources and Ecosystems Sustainability)	College of Forestry and Natural Resources, University of the Philippines Los Baños	BAI & EAHMI Partners	9
Course on "Remote Sensing and GIS Applications for Environmental Animal Health Studies"	Two weeks Oct 07:	TREES (Training Center for Tropical Resources and Ecosystems Sustainability)	College of Forestry and Natural Resources, University of the Philippines Los Baños	BAI & EAHMI Partners	11

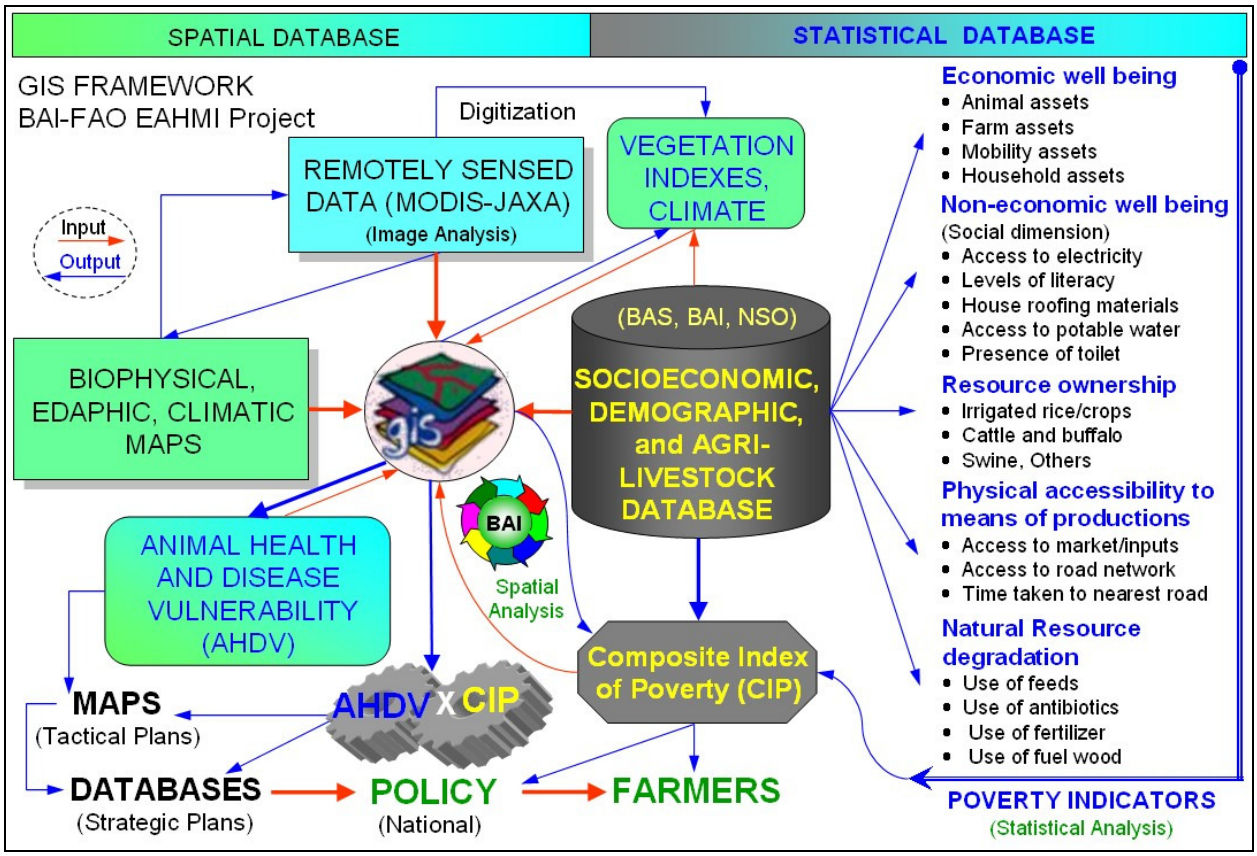
Annex 7 GIS and poverty alleviation

GIS is at the heart of EAHMI. As such, a clearly defined GIS framework is a prerequisite. This framework should include the following elements:

- A unique domain of statistical data and spatial data;
- Integration of these data into a GIS environment; and
- Analysis of rural poverty data and livestock data driving the generation of maps as decision tools.

The interconnected web of the GIS framework is shown in Figure 1, below.

Figure 1. GIS Framework for EAHMI (E C Godilano, 2008)



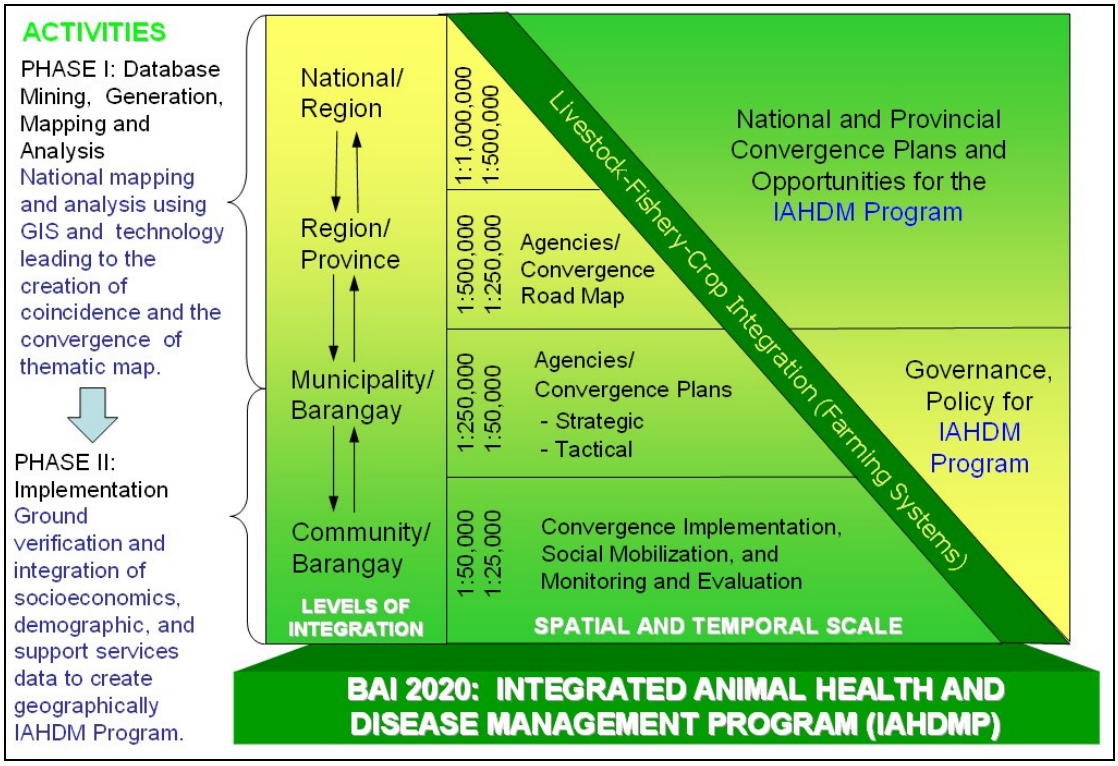
The GIS framework includes the expression of rural poverty as a part of prediction models.[6] GIS binds together the process of EAHMI, but GIS is itself a component in an interplay of stages. The requirement for a solid, reliable and detailed database is at the start of process which can be envisaged to extend beyond this project, always conceived as a probable first stage. The outputs from these data can be scaled up or down in map form. This is shown graphically in Figure 2.

In this context, scaling up or down refers to the definition of map output. "Scaling down" is used for thematic maps, taking national-level data and producing maps at

[6] For more detail on Composite Poverty Index see, for example, Poverty Mapping in the Philippines by Estrella V Domingo, http://www.unescap.org/pdd/projects/pov_map/6a-Philippines%20Poverty%20Mapping%20-%20Main%20Report.doc accessed on 08-May-08.

Regional, Provincial or Municipal levels. For example, national data on land temperature or vegetation index can be outputted on a map with a scale that shows the information at a more local level. Scaling down is not only about changing the scale of the output map, but also concerns enhanced output by adding map overlays, thus, adding information. For example, a map of vegetation index at Province level could be overlayed with roads, land cover, and so on. Likewise, disease models can be integrated into various levels of poverty that prevail in a targeted administrative area, such as Province or Municipality or *Barangay*.

Figure 2 Schematic representation of how GIS outputs can be scaled down and up. (E C Godilano, 2008)



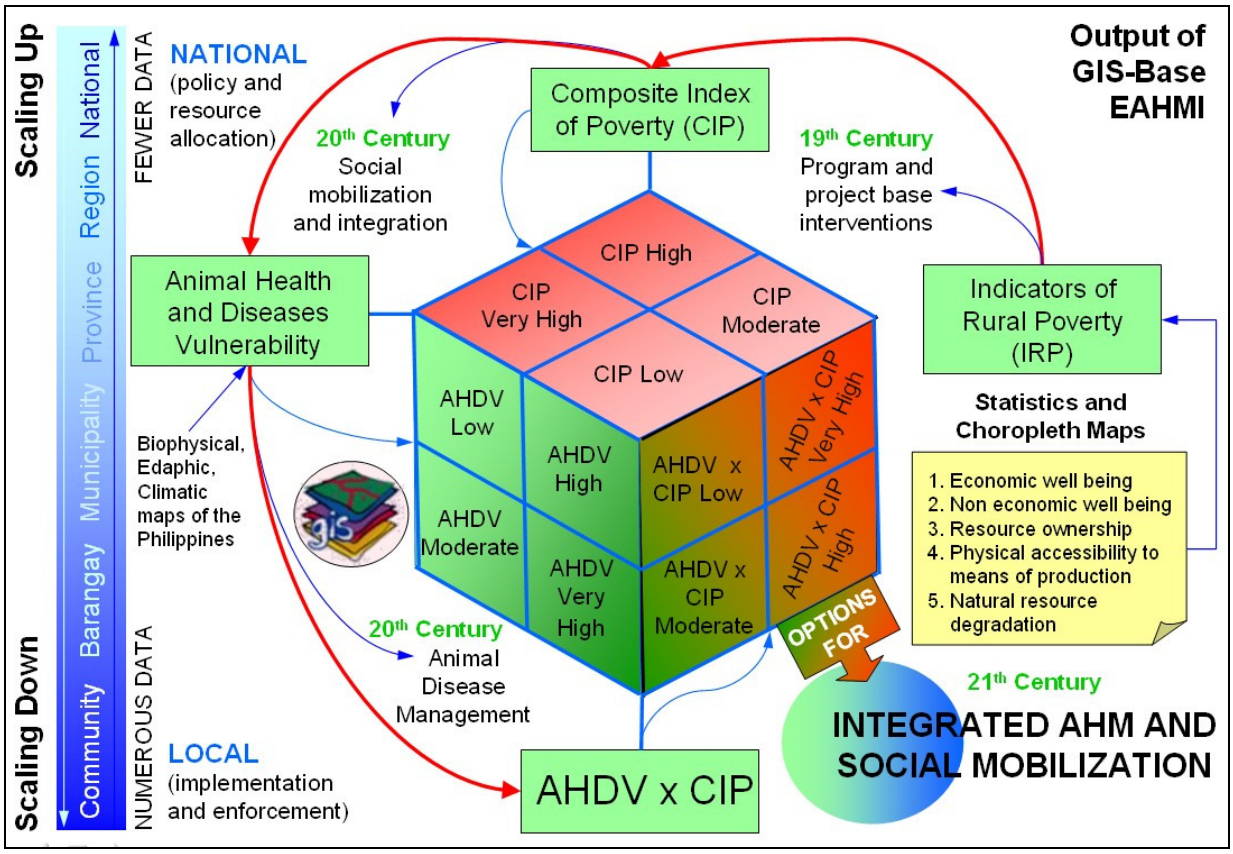
Note. "BAI 2020" is a theoretical vision and does not imply requirement for long-term project extension.

"Scaling up" here refers to datasets in the "lowest" (most detailed) administrative boundaries, which are scaled to the next level of aggregation. For example, a small-scale dairy project successful in a particular location could be scaled up to other suitable locations by addressing a question, such as 'where else is applicable given its biophysical, climatic, edaphic (soil) and poverty characteristics?' The characteristics selected may well comprise those that do not favour the presence of disease vectors or intermediate hosts. Spatial analysis can be used to generate a matrix table and maps. This scaling technique was utilised in the commissioned study on aquaculture and livestock by CSLU; however, their cartographic model lacked the climatic data and multivariate analysis.

GIS position in EAHM and its integration in poverty reduction strategies

Rural poverty is not geographically uniform in the Philippines. Therefore, it is important to try to understand where and why smallholder poverty occurs. The strategic location of an animal health and environmentally oriented GIS at the heart of the project has been discussed in Section 7.1.2. The integration of GIS with policy, rural poverty and animal health are schematically illustrated in Figure 3.

Figure 3. Integrative capabilities of GIS in generating maps in the Philippines context of administrative boundaries, animal health and policy. (E G Godilano, 2008)



The above figure shows the rubric of the processes and outputs of analysis. The processes involve the integration of the statistical and spatial databases, determination of coincidence statistics and display of maps. The figure also shows the progressive sophistication in data analysis, from simple statistical output to the integration of spatial and non-spatial data. The implementation of strategies can vary, to address the various problems of governance and animal health management from national to local level (scaling up or down), where data and information requirements also vary. The mapping exercise can accommodate integration of animal health and disease vulnerability (AHDV) with disease determinants (biophysical, climatic, edaphic and socioeconomic) and disease vulnerability and rural poverty. The approach provides flexibility in defining thresholds and in computing AHDV and poverty indicators.

Annex 8 Animal disease data collection

With particular reference to animal disease and related data collection in the Philippines, coordinated by BAI-ICTU at regional and provincial levels, *the EE recommends that*:

1. Data collection forms should be standardised and fully compatible with the development of a common database template. The database should be GIS-enabled, with fields that are linkable to GIS attribute files.
2. Data collection forms used at Province-level should be simplified and combined to reduce the current duplicated reporting of overlapping information required by different institutions.
3. Data on animal disease, should be geo-referenced.
4. Animal disease data should be compatible with the OIE WAHIS system, building on the work being done in BAI-ICTU in the development of PhilAHIS, primarily for FMD.
5. Municipal-level data on disease occurrence should be reviewed.
6. There should be training of Province and Municipal level data collectors to improve field diagnosis.
7. The timeliness of reporting should be emphasised. Disease reporting is required at least monthly (reports of outbreaks several months after the event are of less value).
8. A system of validation should be built in to check data quality.
9. The national animal disease database should be maintained by ICTU.
10. To encourage free reporting, consideration should be given to ways to reassure livestock owners and raise their awareness that animal health data collectors are not associated with the Bureau of Internal Revenue.
11. Training should be designed and given to data collectors, so that they are better able to:
    i. Recognise disease in the field:
    ii. Know the samples required for confirmatory laboratory testing; and
    iii. Know how to handle and transport these samples.
12. Built-in to the design should be a system of feed-back of information to the lowest levels in the field, for example, in brief summary reports.

Annex 9 Training recommendations

The EE's recommendations on training are presented in detail below. The recommendations are relevant both to a new phase that may start in the Philippines and to start-up of EAHM in new countries.

1. There should be a more thorough assessment of the training needs (TNA) of institutional stakeholders, including: BAI, PCC, NDA and other project partners.
2. There should be a major programme of basic familiarisation and capacity building in GIS use and more advanced training in applications, including: spatial analysis, modelling and disease risk assessment (to be quantified as part of the TNA).
3. GIS training should be given more time and phased in a logical manner (see text box below), covering database management first, then spatial analysis, then remote sensing.

Text box. Contents of a three-unit training course appropriate for EAHMI

Three one-week components of the EAHMI GIS course.

- Week one
  - Database mining, cleaning and statistical analysis
  - Creation of choropleth maps (that is, thematic maps in which areas are shaded or patterned in proportion to the measurement of the statistical variable being displayed on the map).
  - Maps will include those showing various expressions of rural poverty.
  - Data generation using GPS.
  - Map digitization.

- Week two
  - Basic and advanced GIS training
    - Topological overlay techniques.
    - Cartographic modelling.
    - Scaling of maps.

- Week three
  - Remote sensing
    - Basic and advanced analytical techniques.
    - Integration of training from weeks one and two.
    - Ground truthing.
    - Map accuracy testing.

   a. Selected individuals should receive advanced training (to be specified after TNA).

   b. Specific training should be provided following the distribution of the latest GIS software version.

   c. There should be a constant programme of follow-up of trainees.

4. Executives should be given training to enhance the process of incorporation of the technology and EAHM approach into policy. A course, "GIS for Executives", to give decision-makers first-hand understanding of the principles. This training for executives could usefully cover:
   - What GIS is and what it can do.
   - How to create a cartographic model for a participant-defined resource problem.
   - Utilisation of the cartographic model to generate an output map.