PREVENT

Emerging Pandemic Threats

Annual Report to the Australian Department of Foreign Affairs and Trade

August 2012-October 2013

Annual Progress Report
August 2012 - October 2013

Submitted To

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USAID FROM THE AMERICAN PEOPLE

Australian AID

fhi360 THE SCIENCE OF IMPROVING LIVES

On June 6, 2012, the U.S. Agency for International Development (USAID) and the then-Australian Agency for International Development (AusAID) signed a memorandum of cooperation (MoC) to help reduce the risk of emerging pandemic disease threats in the Mekong region of Southeast Asia. Under the MoC, AusAID (now known simply as the Australian Department of Foreign Affairs and Trade) is providing Aus$6 million to USAID's PREVENT project over three years. The Australian support emphasizes the support to PREVENT as a way to boost efficiency and effectiveness in combined actions to reduce the risk of emerging infectious disease. This co-funded work focuses on countries in the Greater Mekong Subregion, particularly Burma/Myanmar, Cambodia, Lao PDR, and Vietnam.

Introduction

Since the MoC was signed, PREVENT has been carving out activities in four countries in the Mekong Region – Burma/Myanmar, Cambodia, Lao PDR, and Vietnam – that could best contribute to Australian Aid's *Pandemics and Emerging Infectious Diseases (EID) Framework, 2010-2015,* which aims to help partner countries build and maintain capacities, systems and protocols in four main areas:

- promoting adherence to international standards of animal and human health
- strengthening systems for the prevention, detection and control of EIDs
- responding to outbreaks of EIDs when they occur
- building an evidence base for the response to EIDs

Although work in this first year has focused on continuing activities initially proposed by USAID, PREVENT anticipates that the following year will yield more activities that specifically address Australian foreign aid goals and objectives. To date, there has been significant headway made in nurturing relationships – and obtaining official approvals – to work in areas heretofore not targeted by USAID activities, such as all of Burma/Myanmar.

Annual Highlights and Links to Australian Aid Goals and Objectives Related to Community-based Emerging Infectious Disease Risk Reduction in the Mekong Region

Highlights from the past year that establish a solid foundation on which to build future work have included activities that all address the Australian Department of Foreign Affairs and Trade's (DFAT) quality criterion of *Relevance, or "Is this still the right thing to do?"* As outlined in the Australian Aid *Framework*, PREVENT works to build capacity, build an evidence base, and respond to outbreaks of EIDs by: working in and near hotspots for emerging pandemic threats to identify populations that are at greatest risk and the specific behaviors that put them at risk for exposure to EIDs from wildlife (e.g., farmers, housewives, market traders, hunters, etc.); conducting market studies, behavioral trials and other qualitative research to illuminate unsafe behaviors; working with local groups to assess the effectiveness and implementation of existing prevention interventions; identifying feasible alternatives to current unsafe behaviors and developing approaches to persuade people to adopt these practices; and providing a wide spectrum of communication support to ministries of health, nongovernmental organizations and media groups on emerging infectious diseases (e.g., training support on interpersonal communication in Cambodia).

Australian Foreign Aid Criteria

To address the Australian Government's foreign aid criterion of ***Effectiveness, or "Are we making the difference that we expected at this point in time?"*** PREVENT has made great progress in formative research outlining the human-animal exposures that will influence future activities in zoonotic-based emerging infectious diseases.

With regard to the criterion of ***Efficiency, or "Is the initiative making appropriate use of [DFAT's] and other partners' time and resources to achieve initiative objectives?"*** PREVENT has worked with a large spectrum of pre-existing and new partners that bring their own resources and connections to bear on activities, and builds upon ongoing activities, such as previous trainings.

In terms of ***Sustainability, or "Will the benefits last?"*** PREVENT staff are embedded in and involved with relevant Ministries of partner governments; include community and other civil society groups in defining priorities and locally sustainable solutions to identified EID problems; build local capacity through community involvement in implementation, monitoring, and data gathering; and raise awareness among the public and policy makers on risks and appropriate actions needed to minimize human infection by emerging zoonotic diseases.

On ***Gender Equality, or "How do we approach gender equality and are we doing it well?"*** PREVENT targets women in all of its research activities, particularly in designing quantitative instruments and methods for the human-animal exposure study in Lao PDR and Cambodia. PREVENT also mobilizes women's groups in the implementation of interventions. Additional social inclusion is demonstrated in the involvement of minority groups as respondents in PREVENT's research activities (e.g., Hmong minority groups in Lao PDR).

On ***Monitoring and Evaluation*****, or "*** ***Is a robust monitoring and evaluation system being used to effectively measure implementation progress, and progress towards meeting objectives?"*** PREVENT ensures that all activities that have community participation have pre- and post-activity evaluations – including community meetings and direct community observations – to make sure that we are on the right track. Moreover, we evaluate all training activities – at the very least, with robust pre-post measures of the three elements of competency: knowledge, skills and values. If time permits, we also assess whether there is an environment sufficiently enabling for the trainees to be able to put into practice what they have learned, and what effect training has on the trainees' performance. This will likely be pursued in Cambodia in the coming year as a follow-up to trainings with frontline workers on avian influenza.

Annual Highlights

Specific highlights that address the aforementioned criteria are as follows. Over the past year, PREVENT has:

- Conducted research in Lao PDR and Cambodia on the Human-Animal Interface to quantify human exposure to wildlife and domestic animals that are likely to carry infectious disease viruses. This included the development of a Human-Animal-Interface framework to describe the relationship between different transmission routes and human activities. Results of this research will help to inform the design and implementation of interventions to reduce the risk of transmission of emerging infectious diseases.

  In designing the quantitative instruments and methods for this survey, **PREVENT took great care to assess the effect of gender and age on exposure to animals**, as we hypothesized that men and women have different types or rates of exposure related to specific gender roles in the society. In each study community, adult women, adult men, boys, and girls were interviewed by both male and female interviewers.

- Worked on Market Biosecurity in Lao PDR, including the development of market monitoring tools and conducting market observation research.

- Contributed to H5N1 avian influenza outbreak response in Cambodia, including implementing trainings to improve the interpersonal communication skills of frontline workers to encourage the community to report sick and dying poultry and to bring sick family members directly to the hospital if they had recent contact with sick or dead poultry.

  Ultimately, this training benefited a total of 412 frontline workers, who are mostly district and community veterinarians, district and community health care workers, community leaders, and volunteers. In addition, across all four provinces, a total of 105 private clinicians, pharmacists/pharmacy owners and clerks were also trained on key messages.

- Set the stage for future work on avian influenza in Cambodia, including interventions in markets and communication-related needs of Ministries on H7N9 and rabies, as well as possibly working with Institut Pasteur to prevent the spillover of Nipah virus among guano farmers.

- Began research on the trade of rodents across the Vietnam-Cambodia border to identify potentially risky practices and situations the rat trade may pose to animal and human health.

- Initiated an expansive national assessment of the biosecurity situation at wildlife farms across Vietnam, including developing a wildlife farm biosecurity assessment tool and conducting biosecurity scoping in six wildlife farms in three provinces.

  Through primary advocacy work, PREVENT contributed to raising awareness on the important issues related to regulating and managing wildlife farms in Vietnam. We also helped to introduce the Government of Vietnam's new policy direction on wildlife management and helped to launch the *Wildlife Farm Biosecurity Subgroup of the Biosecurity Working Group.*

- Travelled on a first mission to Burma/Myanmar and drafted a Letter of Agreement/ Memorandum of Understanding (MOU) with the Government of Myanmar to enable future work.

- Worked in Burma/Myanmar on highly pathogenic avian influenza (HPAI) under the auspices of FAO, and submitted a plan of action focusing on capacity building on HPAI and risk communication among local officials, public and private veterinarians, community animal health workers, small and medium scale poultry farmers, and media in five target townships of FAO in the Mandalay Region.

  A key strategy will be mobilization of local NGOs – such as the Myanmar Veterinary Association, Myanmar Livestock Federation and Myanmar Women's Affairs Federation – to implement training activities.

- Conducted a return field visit to the Yangon poultry production zone (PPZ) and selected townships to observe poultry production activities and hold discussions with stakeholders.

The sections that follow provide specific achievements in each of the following countries: Lao PDR, Cambodia, Vietnam, and Burma/Myanmar.

Lao PDR

Over the past year in Lao PDR, PREVENT's work has focused on two main areas:

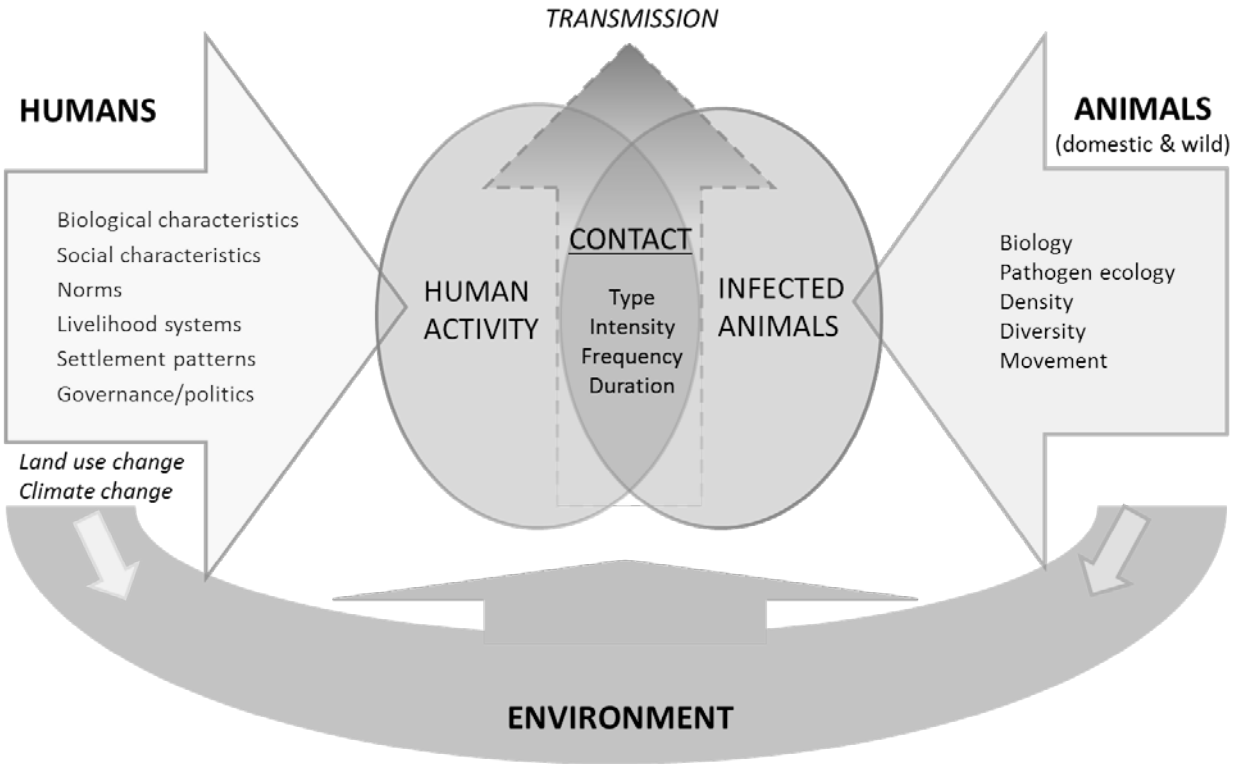
1. Research on the Human-Animal Interface
2. Market Biosecurity

PREVENT's partners in Lao PDR include: GOL agencies (NEIDCO, Ministry of Health, Ministry of Agriculture and Forestry (MAF), NAHC, and NCLE), and other EPT partners including PREDICT, RESPOND, IDENTIFY/WHO, and USAID/RDMA.

Human-Animal Interface Research

In Lao PDR, there has been steady progress in quantifying the human exposure to wildlife and domestic animals that are likely to carry infectious disease viruses. This research set out to provide estimated rates of human exposure to different animals, quantify the risk of emerging infectious diseases, and identify populations or subgroups with particularly high rates of exposure. Results of this research will help inform the design and implementation of interventions to reduce the risk of transmission of emerging infectious diseases.

Human-Animal Interface Assessment Framework



Methodology

PREVENT developed a Human-Animal-Interface framework to describe the relationship between different transmission routes and human activities (see Box above). Under the framework, the opportunities for transmission depend on how people interact with animals. The type of exposure can be conditioned by the type of animal and the location in which interactions occur, which are in turn related to human activities. Following this framework, the study was designed to quantify specific types of human exposure to animals (that occur in different locations and in association with different specific human activities) defined by specific transmission routes. What is measured is the frequency of exposure to animals and, to a certain extent, and intensity of exposure (e.g., consumption of cooked animal blood is probably less risky than consumption of raw animal blood).

In designing the quantitative instruments and methods for this survey, **PREVENT took great care to assess the effect of gender and age on exposure to animals**, as we hypothesized that men and women have different types or rates of exposure related to specific gender roles in the society. In each study community, adult women, adult men, boys, and girls were interviewed by both male and female interviewers.

Early Preparatory Work, Pretesting and Training

An initial survey instrument for this research was designed in 2012, and in October and November of that year, PREVENT conducted a cognitive pre-test of the instrument among Lao and Hmong populations in villages within Bolikhamxay province. The pre-test employed cognitive interviewing, which is intended to explore how questions translated into Lao and Hmong are processed and understood by people to ensure that we gather valid and accurate information. In addition, a few key informant interviews were conducted to answer outstanding questions from the formative research.

Rapid Asia, a research consulting firm based in Bangkok, was contracted by PREVENT to provide all of the Hmong and Lao researchers needed to conduct this study. This implementation of a cognitive pre-test in Laos included three distinct activities:

1. Forging collaborations with local partners, including staff from the Department of Disease Control (DDC) of the Ministry of Health (MOH) to inform them of the forthcoming activities and ask for their assistance. In the end, staff from federal, provincial, and district offices assisted during the implementation of the study and contributed to the successful completion of the work.
2. Training research staff in Vientiane on all aspects of the study, including background on PREVENT, interviewing techniques, ethical guidelines, and sampling and logistical procedures.
3. Field work in Bolikhamxay Province (in Hmong and Lao villages) to conduct cognitive pre-tests. Overall, 40 cognitive interviews (19 women and 21 men) and three key informant interviews were conducted.

Below: *Research participants during their 2012 training in Vientiane*

Earlier in 2012 (in April), PREVENT had conducted a formative study on human-animal exposure in Lao PDR in two provinces: Bolikhamxay and Attapeu. In Bolikhamxay, two groups (Hmong and Lao communities) were selected near the Theun Hinboun Power Company (THPC) dam extension reservoir. In Attapeu, Lao communities near the Attapeu provincial capital (Attapeu town), and a Brao ethnic community near an area known for heavy logging, were selected. As part of this activity, PREVENT staff recruited and trained field interviewers, supervisors, and data encoders on the content and use of the research tools. The field interviewers trained a Lao Team (with 10 participants) and a Hmong Team (12 participants). Notably, a separate Hmong language training was conducted to ensure the accuracy of the reading and writing skills of the Hmong team, as Hmong is not a commonly written language, even among native speakers.

From left to right, above: Getting approval from local authorities. Mapping sample households in consultation with village representatives. Data encoding after daily interviews.

Photos below: Training of Research Staff

Photos below: Study Villages and Interview Locations

Early on, PREVENT also conducted a secondary literature review of available resources in Lao PDR that document human exposure to wildlife, particularly to primates, rodents, bats, and civets; and to assess the risk borne by such exposure in terms of emerging zoonoses with pandemic potential. The review showed that while wildlife exposure to humans has been extensively investigated, mainly by wildlife and nature conservation agencies, the opposite (i.e., exposure to wildlife) has been hardly documented.

Research Implementation and Results

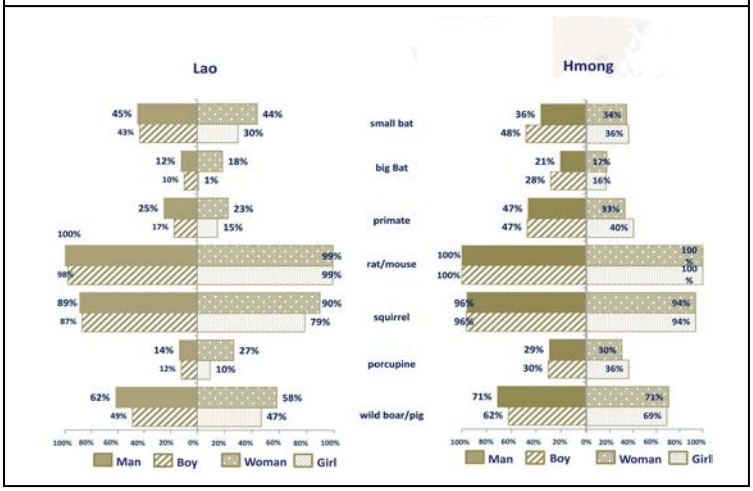
PREVENT began implementing the survey in Khamkeut District, Bolikhamxay Province, Laos from February to April 2013.

On July 18, 2013, PREVENT (in collaboration with NEIDCO) hosted a one-day research dissemination forum to share the findings from four field studies; highlight the implications of the research findings to the Lao PDR government so they could better take action; and encourage continued knowledge sharing and sustained cooperation among partners and stakeholders. The meeting was attended by more than 40 government representatives from four main ministries: health, agriculture, trade and industry, and environment/wildlife and natural resources.

At the forum, PREVENT presented the following key findings from human-animal exposure quantitative household survey in Khamkeuth District, Bolikhamxay Province in Lao PDR.

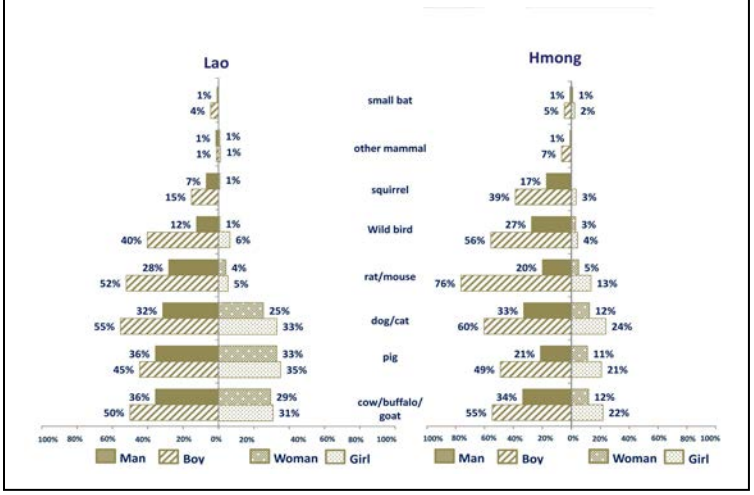
There is nearly universal exposure to domestic animals and rodents by all -- Both Lao and Hmong, male and female, adults and children. Although Lao and Hmong participants reported having similar exposure with small bats, Hmong children reported having more contact with big bats than Lao children. Hmong reported having more contact with primates than Lao. No gender difference was found in contact with primates among both Lao and Hmong participants. In addition, Hmong participants reported more exposure to porcupines and wild boar/pig. (See Figure 1.)

Figure 1: Overall exposure to wild animals



Both Lao and Hmong children (boys and girls) are more exposed to wild animal bites/scratches than adults. Hmong boys (39%) reported more contact with squirrel, wild bird, and rat/mouse bites and scratches than Hmong adults (men 17%, women 0%) and Hmong girls (3%), and more than Lao adults and children (men 15%, women and girls 15% or less). Lao and Hmong children reported similar contact with dogs/cats, pigs, and cow/buffalo/goats. (See Figure 2.)

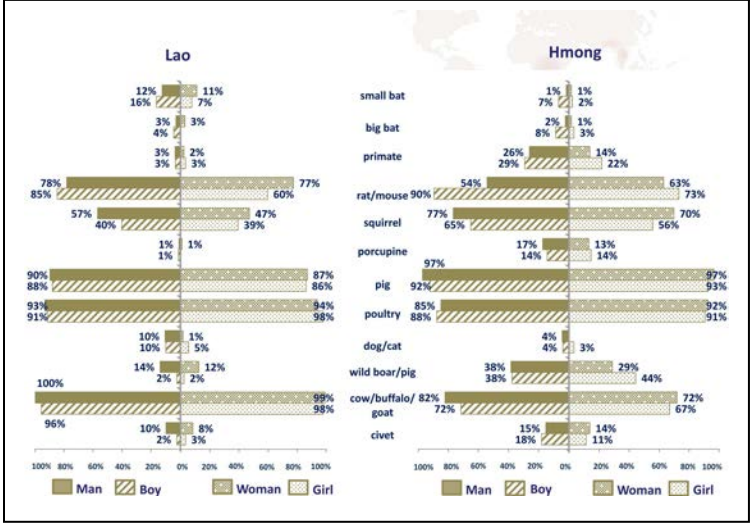
Figure 2: Being bitten or scratched while raising or hunting



Contact with animal feces (domestic and wild) is an important route of exposure for everyone.
Children reported higher contact with cow/buffalo/goat feces and poultry than adults, while adults reported more contact with rat/mouse feces. Lao reported more contact with pig and wild bird feces than Hmong. Lao and Hmong reported having similar contact with small-bat feces. In addition, Lao had higher exposure to wild bird feces than Hmong. Although Hmong adults had more exposure to rats/mice than poultry, Hmong children had more exposure to poultry than rats/mice.

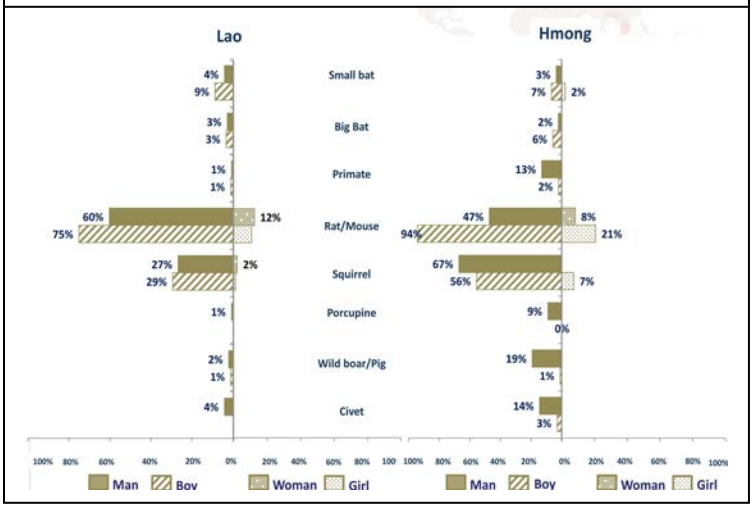
Rodents are an important part of the diet for both Lao and Hmong. More than 60% reported consuming rodents. Primates (more than 20% of Hmong vs. 3% of Lao reported consuming primates) and wild boar/pig (more than 30% Hmong vs.14% of Lao reported consuming wild boar) have an important place in Hmong diet. Conversely, Lao reported having more contact with small bats than Hmong (e.g., about 11% of Lao adults vs. 1% of Hmong adults). Hmong girls (44%) reported consuming more wild boar/pig than Hmong women (29%). Hmong reported more contact with civets than Lao. Hmong (more than 14%) reported consuming more porcupines than Lao (1%). (See Figure 4.)

Figure 4: Animals consumed



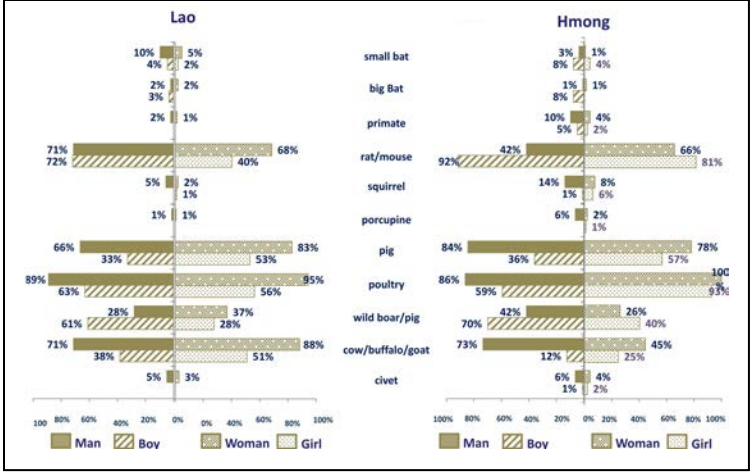
Hunting puts men and boys at higher exposure with animals than women.
Overall, men and boys reported higher contact with rodents, primates, wild boar/pigs (especially men) than women and girls (higher for Hmong than Lao). Hmong men reported having more contact with primates, porcupines, wild boar/pigs, and civets than Lao men and boys and Hmong boys. In addition, Hmong men are more exposed to primates, wild boar/pigs, and civets than Hmong boys and Lao men and boys while hunting animals. Although men hunt more large animals (e.g., primates, wild boars), boys hunt more small animals (e.g., rats, bats). (See Figure 5.)

Figure 5: Animals hunted



Women and girls are just as exposed as men and boys during the slaughter, butcher, and preparing of either wild or domestic animals. (See Figure 6.)

Figure 6: Animals prepared



As a result of the research dissemination forum in July 2013, PREVENT proposed to conduct a Participatory Rapid Appraisal of approaches to reduce human exposure to bats and rodents. It is hoped that this appraisal will provide a basic framework for bat/rodent risk mitigation strategies, as well as expand knowledge and understanding of the local context surrounding human contact with bats and rodents. This basic research is needed to develop feasible, acceptable, and effective interventions.

Market Biosecurity Work

Another key activity in Lao PDR has been improving market biosecurity. Initially, PREVENT hosted and facilitated a Lao PDR Market Working Group meeting and planning session on June 5, 2013. This meeting was designed to: revisit national market guidelines; discuss the role of the Market Working Group and challenges associated with the implementation of market guidelines; review the role of the Surveillance Rapid Response Team and reporting system and how it can utilize the market monitoring tool; and draw recommendations how to move forward with market monitoring initiatives under the leadership of provincial/district authorities.

Organized by the Department of Communicable Diseases and Control, the meeting was attended by 15 government representatives from Vientiane Capital Agriculture and Forestry; the Vientiane Capital Health Office; the Bureaus of Food and Drug, Industry and Commerce, and Livestock and Fisheries; and the National Center for Laboratory and Epidemiology, Hygiene and Promotion, and Water & Sanitation.

At the meeting, PREVENT presented results from market observation research that was conducted in collaboration with the PREDICT project (via the Wildlife Conservation Society) in 44 markets in Lao PDR. The study confirmed that small wild animals are commonly sold in the market: rodents, bats, non-human primates, and civets are sold alive and freshly dead. The study revealed that market biosecurity in general is poor, and heightened concern about the potential health risks posed to humans and

livestock in certain markets in Lao PDR. PREVENT presented the government and other stakeholders with a policy brief that listed implications based on the market observation work.

The meeting attendees concluded that the clear involvement of committees from central offices like MAFF, MOH, Trade and Commerce, the Ministry of Environment (wildlife, waste management), Public Works and Transport was needed. At the provincial/district level, the participants underscored the involvement of the governor's office, environment police, market authority, health departments, agriculture departments, zone development officials, and the village chief.

The meeting participants agreed on the need to focus on dialogue and advocacy to engage local leadership to implement relevant local laws; to prioritize activities that will involve relevant local staff doing surveillance and certification; and to make use of the results of the market observation study to educate local leaders of the situation of markets in their locality.

Left: Participants brainstorm on sustainable options how market monitoring can be mainstreamed in the work of the surveillance and response team

It was determined that PREVENT would provide technical assistance to assist provincial and district governments in monitoring market biosecurity and in achieving improved biosecurity actions that are acceptable, doable and practical within the context of markets in Lao PDR, and would use the government's and WHO guidelines for poultry market biosecurity developed in 2008 as a basis.

Market Monitoring Tools

PREVENT henceforth focused on assisting local/district market stakeholders in using a market monitoring checklist formulated in harmony with existing WHO market guidelines and Trade and Industry's market decrees.

In August 2013, PREVENT began the process by meeting with government partners to review a draft monitoring checklist for improved market biosecurity. The monitoring checklist was updated from the previous version to cover main market elements, such as zoning and hygiene, and expanded to include all animals/meat sold in markets instead of only poultry. From the meetings and visits to two markets, a revised draft of the checklist was shared with stakeholders, including the Provincial Health Department of Vientiane Capital, for review and comment.

In the Coming Year: The next step is to hold a stakeholder engagement meeting in Vientiane Capital and Vang Vieng Province. PREVENT will also seek opportunities to pilot market working group initiatives that will be sustainable over the long-term.

Cambodia

Over the past year, PREVENT's work in Cambodia has focused on three main areas:

1. Research on Human-Animal Exposure
2. Avian Influenza Outbreak Response
3. Assessment of the Cross-Border Rat Trade (with Vietnam)

PREVENT's partners in Cambodia include: PREDICT/Wildlife Conservation Society, Cambodia Ministry of Agriculture, Ministry of Forestry and Fisheries, Ministry of Health, FAO, and the Cambodian Red Cross.

Human–Animal Exposure Research

PREVENT and PREDICT (again via the Wildlife Conservation Society) began implementing human-animal interface surveys in Cambodia in early 2012 to collect information about meat consumption and associated hunting and butchering from all households in selected villages to determine how the potential risk associated with these activities is distributed among the population. Wild animals of priority interest included rodents, bats, and primates. Domestic animals of interest included chickens, ducks, pigs, dogs, and cats. The surveys were carried out in conjunction with PREDICT's animal surveillance study visits to villages.

The research team collected baseline data in three villages in each of two provinces: Mondulkiri and Banteay Meanchey. As part of the baseline research, the team interviewed all female heads of household in each village: 92 in Mondulkiri and 117 in Banteay Meanchey.

To understand how contact with animals might vary by season, the team carried out quarterly follow-up surveys of a subset of 20 households in each village: the 10 that reported consuming the greatest number of wild animals in the previous month during the baseline; and a comparison group, selected randomly from the other remaining households in the village that agreed to be contacted again. The first follow-up survey in Mondulkiri was implemented in August 2012, and the second in November 2012. The first follow-up survey in Banteay Meanchey occurred in October 2012. Key results are found below.

Consumption of Wild Animal Meats

Among high consumers of wild animal meats between May and August 2012 in Mondulkiri, there was a significant increase in consumption of wild pig (from 53% to 77%) and mouse deer (from 17% to 30%), and a significant decrease in consumption of civet (from 33% to 20%), monkey (from 20% to 10%), rat (from 17% to 7%), squirrel (from 33% to 3%), frog (from 17% to 0%), gibbon (13% to 0%), buffalo (from 7% to 0%), and slow loris (from 7% to 0%).

In Banteay Meanchey, consumption of rat meats significantly decreased from 50% to 27% between July and October 2012 among high consumers of wild animal meats. It is worth noting a higher consumption of rat meats (43%) among the comparison group compared to only (27%) among high consumers of wild animal meats during the first follow-up survey in Banteay Meanchey.

Consumption of Domestic Animal Meats

Results revealed a significant increase in consumption of fish (from 63% to 77%), and significant decreases in consumption of pork (from 57% to 30%), chicken (from 47% to 10%), and cow (from 30% to

13%) among high consumers of wild animal meats in between the baseline and follow-up surveys. In Banteay Meanchey, a significant increase in the consumption of fish (from 73% to 97%) and duck (from 3% to 27%) was observed in between the baseline and follow-up surveys. Interestingly, during the follow-up survey in Mondulkiri, consumption of fish, pork, cow, and duck meats was slightly higher among high consumers of wild animal meats compared to the comparison group. Conversely, in Banteay Meanchey, consumption of fish, pork, cow, and chicken was slightly lower among the high consumers of wild animal meats.

PREVENT and PREDICT had conducted a first trimester study in May and June 2012 in both provinces. In each province, the qualitative research team conducted six focus group discussions among adult men and women, three key informant interviews, and 10 individual interviews in three forest villages. This qualitative research focused on learning which wild animals people could identify, which they were most exposed to, sensitivities about talking about animals, and hunting practices. For the quantitative research, the team interviewed senior women in all households in three other villages about animals raised and consumed, as well as about some hunting-related activities. The results of quantitative survey data collected through a brief household questionnaire served as the baseline. They were used to identify two groups of households from among those who agreed to be contacted during the follow up surveys: the 10 households which consumed the greatest number of animals in the previous month, and 10 randomly selected from the remainder of the sample. These 20 households were invited to participate in PREDICT's animal sampling study and a quarterly follow-up survey about their domestic animals and consumption of meat.

Avian Influenza Outbreak Response

Due to continued avian influenza outbreaks and deaths (from January through March 2013, Cambodia recorded nine human cases and eight deaths from avian influenza infection), PREVENT was asked by the USAID/Cambodia Mission to help respond to the government's concerns over these deaths by providing technical assistance related to avian influenza outbreak prevention and risk communication.

PREVENT staff began planning in February 2013 with USAID, the Ministry of Agriculture, Ministry of Forestry and Fisheries (MAFF), and Ministry of Health (MOH). After reviewing other response activities by other partners, including FAO and WHO, PREVENT presented a plan to continue training provincial/district and community frontline workers – an activity initiated by PREVENT in 2012. The intention was to help improve early detection and response to outbreaks in poultry, as well as garner more village-level involvement in preventing the consumption of sick and dead poultry.

In collaboration with the MoH, MAFF and the Cambodian Red Cross, PREVENT managed the provincial training, which was geared to improving the interpersonal communication skills of frontline workers to encourage the community to report sick and dying poultry and to bring sick family members directly to the hospital if they had recent contact with sick or dead poultry. PREVENT conducted refresher training courses with the five master trainers who were initially trained in 2012. These master trainers were then dispatched to the previously mentioned four high-risk provinces and trained a total of 44 provincial trainers.

Photos from left to right: Provincial district trainings were held both indoors and outdoors, depending on available space. Participants were divided into working groups. Exercises on how to deliver and remember key messages were conducted.

During all of the trainings, PREVENT strengthened the training and interpersonal communication skills of the trainers to deliver and reinforce two key messages: (1) report to authorities all sick or dead poultry; (2) if a family member has been in contact with poultry, get this person immediately to a hospital or health center to seek treatment.

Three training teams were created for simultaneously deployment in three provinces. Each team, along with a PREVENT master trainer, went to different provinces (Takeo, Kampot, and Kampong Speu) from March 18-22, 2013 to conduct two-day training-of-trainers sessions on interpersonal communication skills related to avian influenza; a training for volunteer "frontline agents" at district levels; and an orientation for private clinicians, pharmacists, and pharmacy clerks. The last set of trainings was held at the border of Vietnam and Kandal Province from March 25-29.

Ultimately, this training benefited a total of 412 frontline workers, who are mostly district and community veterinarians, district and community health care workers, community leaders, and volunteers. In addition, across all four provinces, a total of 105 private clinicians, pharmacists/pharmacy owners and clerks were also trained on key messages.

Cross-Border Rat Trade Research

During the past year, PREVENT worked on designing a protocol for a cross-border rat trade study. The goal of this study is to produce a descriptive analysis of the cross-border rat trade in the Mekong Delta region of Vietnam and adjacent provinces of Cambodia to identify potentially risky practices and situations the rat trade may pose to animal and human health. The specific study objectives include to:

1. Document the scope and structure of the rat trade between Southern Vietnam and Cambodia;
2. Identify the various types of rats and rat products in the market chain (local names, descriptions, and biological identification, if possible); and
3. Document specific practices and situations that could potentially result in risky exposure to rats.

Additional details can be found in the *Vietnam* section of this report.

Other Partnerships

PREVENT participated in Cambodia's strategy formulation workshop in Phnom Penh on June 24-27, 2013. The workshop was aimed at enhancing a strong collaboration and functional institutional arrangements between the Ministries of Health, Agriculture, and Forestry and Fisheries to address the emergence of infectious diseases from animals including wildlife. Results of this workshop provided insights to government partners on what types of assistance they need to implement the strategy in the medium-term and long-term.

The workshop served as venue to achieve agreement on: (1) process, format and content of the strategic plan for endorsement of the two relevant ministries; (2) institutional arrangements to manage and monitor the implementation of the activities proposed to advance the strategic plan in the short- and medium-term; (3) linkages of current public and animal health strategies and initiatives to the zoonotic diseases strategic plan, and on a set of activities to reinforce the existing synergies and linkages; (4) areas of collaboration and priority diseases as established in the Zoonotic Diseases Strategic Framework of Cambodia; and (5) a work plan to commence a modest implementation of the strategy in January 2014.

The participants of the EID strategy planning workshop

In the Coming Year: From this workshop, PREVENT sees the opportunity to provide assistance to the government in pursuing Cambodia's one-year pilot avian influenza interventions in markets, mentoring/supervision of the previously trained trainers, and other communication-related needs of both ministries on H7N9 and rabies.

PREVENT Technical Director Dr. Susan Zimicki also visited Cambodia in July 2013 to discuss activities for the coming year, including a possible collaboration with Institut Pasteur. The Institut has identified a group of guano farmers – essentially villagers who create roosts to attract bats and then harvest the guano. This is a potentially risky activity, as Nipah virus has been detected in bats in Cambodia, and recently a beta-coronavirus was isolated from bat guano in Thailand. Researchers from Institut Pasteur also noted that farmers may tap date palm trees for sap; depending on the method used, the raw sap may be contaminated by bats – this is the major natural source of Nipah virus infection in Bangladesh.

PREVENT's future work with Institut Pasteur may include a qualitative investigation to improve understanding of guano farmers' risks and identify opportunities for interventions to reduce those risks.

Vietnam

In Vietnam, PREVENT staff focused on three areas:

1. Research on Cross-Border Rodent Trade (with Cambodia)
2. Assessment and Technical Assistance Related to Biosecurity at Wildlife Farms
3. Participation in Vietnam's One Health Activities

PREVENT's partners in Vietnam include: Government of Vietnam Ministry of Agriculture and Rural Development, Department of Health, Department of Animal Health, Department of Livestock Production, Biosecurity Working Group, Vietnam Administration of Forestry; FAO; the office of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); National Institute of Animal Husbandry; the Vietnam One Health University Network; EPT projects including PREVENT, PREDICT, and RESPOND; international wildlife protection organizations such as Wildlife Conservation Society, TRAFFIC, and the International Livestock Research Institute (ILRI); One Health Communication Network; and the Partnership on Avian and Human Influenza (PAHI).*

Cross-Border Rat Trade Research

The goal of this study is to produce a descriptive analysis of the cross-border rat trade in the Mekong Delta region of Vietnam and adjacent provinces of Cambodia to identify potentially risky practices and situations the rat trade may pose to animal and human health. The specific study objectives include to:

- Document the scope and structure of the rat trade between Southern Vietnam and Cambodia;
- Identify the various types of rats and rat products in the market chain (local names, descriptions, and biological identification, if possible); and
- Document specific practices and situations that could potentially result in risky exposure to rats.

As a first step, an exploratory, qualitative study with rat trade dealers in Vietnam will be implemented. The study will profile rat trade dealers, describe the rat trade, and provide information to design a more in-depth study on rat traders' practices and situations that may put them at potential risk of zoonosis from rats.

PREVENT is working closely with Department of Animal Health (DAH) provincial officials to obtain permits required by local authorities to study the rat trade. Although national permits have been obtained by PREVENT, additional permission is required by the provinces. Government officials are also assisting PREVENT in identifying key informants for the study, and offering the services of DAH Market Veterinary officers to collect information on the quantity of rats in markets. (DAH veterinarians visit district- and/or commune-level markets on a daily basis and could collect information on the quantity of rats present.)

PREVENT has also identified the types and numbers of the markets in the Mekong Delta Region for conducting a rat price and quantity monitoring study. It was determined that it is feasible to implement the rat trade quantity and price through the mobile SMS system in selected provinces in the South of Vietnam.

In the Coming Year: PREVENT will implement multiple studies to identify the structure and scope of the rat trade, and practices and situations that may contribute to disease emergence, with the ultimate goal of developing a risk reduction strategy.

Vietnam Wildlife Farms Biosecurity Assessment

To strengthen wildlife farm management in Vietnam, PREVENT's work in this area is focused on a pilot national wildlife farm registration census to be undertaken by the Government of Vietnam (GOV) and supported by PREVENT in partnership with the UN Food and Agriculture Organization (FAO). At registered and unregistered farms, the pilot study will collect information on: 1) the type and number of domestic and wild species; 2) the location of the farm, using both addresses and GPS coordinates; and 3) the name and contact information of each farm owner. Results from the census will be used as a sampling frame for a subsequent Wildlife Farm Biosecurity Assessment.

Preparatory Activities

To get an initial 'lay of the land,' PREVENT engaged a biosecurity consultant, Dr. Andrew Bisson, to: 1) assist in developing and finalizing a wildlife farm biosecurity assessment tool; 2) share the draft tool with a group of experts, including interested representatives of the Biosecurity Working Group, Department of Livestock Production, Vietnam Administration of Forestry (VNForest), Department of Animal Health and other key stakeholders; 3) present the draft tool and engage key experts in discussion of the tool at a meeting dedicated to discussing the importance of wildlife farms and disease emergence in Vietnam; and 4) support pre-testing of a biosecurity assessment tool.

Based on data provided by Vietnam Administration of Forestry, Dr. Bisson conducted a quick assessment of wildlife farm data and found that 88% of wildlife farms in the Mekong region raise four main species: crocodile, python, porcupine, and wild boar.

In November 2012, PREVENT, in collaboration with VNForest and Ministry of Agriculture and Rural Development (MARD), conducted biosecurity scoping in six wildlife farms in three provinces of Mekong region. The scoping activity found that biosecurity standards were variable and generally low, and that there is significant potential for disease transmission and propagation on the wildlife farms visited. The scoping also revealed the following about farming of specific species:

- Macaque farms: Animals are produced for medical research but recent tightening of export conditions has excluded the small farms from the market (several very large farms continue to farm and export macaques).

- Porcupine farms**:** There has been a collapse in porcupine prices since 2010 (from 15-20 M dg/breeding pair to 2-3 M dg/pair) and it takes 1.5-2 years to raise a porcupine to market weight (10 kg). Farmers are seeking alternative income streams or strategies to reduce costs, hoping that as production volume drops prices may recover.

The farm visits yielded a useful amount of information and generated considerable interest within VAF for future strategy. Based on the field observation, Dr. Bisson developed a biosecurity assessment tool and shared it with relevant stakeholders for comments.

Through primary advocacy work, PREVENT contributed to raising official awareness on the important issues related to regulating and managing wildlife farms in Vietnam. It also identified potential policy development opportunities for PREVENT and other EPT and non-EPT partners related to wildlife farming in Vietnam.

Expert Consultation Meeting

The Vietnam Administration of Forestry (VNFOREST) and PREVENT co-organized an expert consultation meeting, held January 25, 2013 in Ho Chi Minh City, on "Strengthening Wildlife Farm Biosecurity and Supporting the Development of Good Wildlife Farm Production Practices."

The purpose of the workshop was to convene key stakeholders to discuss the current conditions of wildlife farming in Vietnam and the way forward. Specific objectives of the meeting were to:

- Introduce the Government of Vietnam's new policy direction on wildlife management;
- Present PREVENT's plans for a wildlife farm biosecurity assessment (a first step in developing policies and regulations to improve biosecurity); and
- Gather feedback from key stakeholders to improve the biosecurity assessment approach and tools.

The meeting began with a global overview on wildlife farming and included presentations on the current activities of the key government departments and non-governmental stakeholders. Plans for PREVENT's wildlife farm biosecurity assessment in southern Vietnam were presented, and participants broke into groups to review and provide comments on the draft biosecurity assessment tool.

The meeting provided an opportunity for the 60 stakeholders attending – including representatives from Government of Vietnam agencies, international and local NGOs, and universities – to improve awareness of wildlife farming issues, including risks from zoonotic diseases, conservation issues, and challenges and constraints facing wildlife farms and regulators in Vietnam.

Strengthening Wildlife Farm Biosecurity and Supporting the Development of Good Wildlife Farm Production Practices Meeting Participants

One outcome of the meeting was that PREVENT and VNForest were able to obtain updated data on the location and species of registered wildlife farms at the village level in eight provinces in the Mekong Delta Region of Vietnam, including: An Giang, Bac Lieu, Binh Duong, Binh Phuoc, Ca Mau, Dong Nai, Tay Ninh and HCMC. This data will guide the sampling framework for the biosecurity assessment.

Biosecurity Assessment Tool

Based on feedback provided at the January meeting, PREVENT revised the biosecurity assessment tool and subsequently convened a small group of experts to further review the tool and provide advice. The initial aim was that it would be possible to use the tool at farms that raise wildlife mammals, particularly those with a minimum number of at least one of the key species: primates, rodents, bats, and civets. The results of this activity would, in turn, provide input for developing regulations and identifying areas that may benefit from capacity building. In addition, the tool will provide a template for biosecurity assessments of other types of farmed wildlife.

Wildlife Farm Biosecurity Subgroup of the Biosecurity Working Group

On June 11, 2013, PREVENT, in collaboration with the Department of Livestock Production and FAO, organized the first meeting of the *Wildlife Farm Subgroup* of the *Biosecurity Working Group.* The objectives of the meeting were to: 1) develop terms of reference for the subgroup; 2) develop a coordination mechanism; and 3) identify priority focus areas for the subgroup. The hope is that this body will assist in overseeing and providing guidance on any future activities related to biosecurity at wildlife farms.

The participants included representatives from the Department of Livestock Production; Department of Animal Health; the CITES office; FAO; National Institute of Animal Husbandry; Vietnam One Health University Network; USAID-funded projects such as PREVENT, PREDICT, and RESPOND; international

wildlife protection organizations such as WCS, TRAFFIC, and International Livestock Research Institute (ILRI); and zoos in Hanoi.

Above: Wildlife Farm Biosecurity Working Group's First Task Subgroup meeting attendees

Assessment Implementation

Since the Subgroup meeting, PREVENT has been regularly conferring with officials from VNForest and CITES to obtain support for the wildlife farm biosecurity assessment at the national, regional and provincial levels. Implementation of the assessment is pending the receipt of wildlife farm registration lists; these lists are needed in order to draw an appropriate study sample.

PREVENT has already collaborated closely with VNForest to obtain lists of registered wildlife farms in Forestry Region 3 (which includes 22 provinces of southern Vietnam). To better understand the national distribution of wildlife farms, PREVENT met with VNForest officials from Regions 1 and 2 in July/August 2013. According to the data reported by regional offices, there are a total of 2,909,724 wild animals with 5,831 registered farms in the Northern Region, and 98,533 animals with 1,030 registered farms in Central Region of Vietnam.

In the Coming Year: PREVENT will collect baseline information on biosecurity at registered wildlife farms with key species. The information will be used to support the Government of Vietnam in strengthening registration of wildlife farms and will identify strategies to improve farmer biosecurity/good production practices for development and implementation. PREVENT will also support the Biosecurity Working Group Task Force on Wildlife Farm Biosecurity in collaboration with FAO and DLP.

Vietnam One Health Activities

PREVENT worked with the Ministry of Agriculture and Rural Development, in cooperation with the Ministry of Health and other national and international agencies to organize a Vietnam National One Health conference in April 2013. The conference objectives are to: promote the application of a One Health approach to address zoonotic diseases and non-zoonotic diseases impacting food security, food safety and livelihoods with national leaders, senior officials and experts; consider how the ongoing national One Health programs and activities in Vietnam fit into the larger context of the global movement towards a One Health approach; and identify a key set of next steps and a timeline to support the Government of Vietnam in establishing a One Health road map and action plan including discussion of resourcing requirements.

Starting in January 2013, the PAHI Secretariat under MARD established an informal working group to prepare for the conference. PREVENT is a contributing member of the working group, and helped to develop a One Health stakeholder mapping exercise. PREVENT made a presentation on the Wildlife Farm Biosecurity Assessment activity before the over 250 participants who attended the two-day conference. PREVENT also regularly participates in the One Health Communication Network, organized by PAHI under MARD.

In the Coming Year: PREVENT will continue as an active and supporting member of the One Health Communication Network.

Burma/Myanmar

Burma/Myanmar was added to the PREVENT list of priority countries with the expanded Australian foreign aid support, and work over the past year has focused on making initial inroads into the country.

PREVENT's partners in Burma/Myanmar include: DFAT, USAID, FAO, Government Ministry of Livestock and Fisheries, Ministry of Health, Department of Medical Science, Ministry of Agriculture and Livestock, Ministry of Social Affairs, Myanmar Veterinary Association, Myanmar Livestock Federation, and Myanmar Women's Affairs Federation

First Mission

Following a mission conducted by USAID's regional health advisor based at RDMA/Bangkok to introduce the PREVENT project to the Myanmar Government officials, a follow-up mission was fielded by PREVENT, USAID, Australian foreign aid officials, and FAO in December 2012.

During this Mission, PREVENT was introduced to the concerned national and state-level ministers and DGs: the Union (national-level) Minister for Livestock and Fisheries, three Directors General from this Ministry, the Union Minister of Health, and the Deputy Minister and the Director General of the Department of Medical Science. The combined mission also met with the newly expanded Mandalay Region (state) government, including the Minister for Agriculture and Livestock and the Minister for Social Affairs.

The newly expanded State and Regional governments were eager to engage and deliver services. Areas where they indicated they would welcome support included: training in communication skills for officials who work with farmer groups and market managers. In addition, because of recent increases in the number of publications and media outlets, media training for officials – as well as an introduction to the "one health" concept for journalists – was mentioned.

Other activities that PREVENT may take on eventually include social monitoring and community-based epidemiology. The geographic focus of PREVENT activities will be Mandalay and Sagaing, two geographic regions with a high concentration of poultry production.

Since the December 2012 mission, PREVENT activities in Burma/Myanmar have been conducted under the auspices of FAO and in collaboration with the Ministry of Livestock and Fisheries and have related only to FAO's work in avian influenza.

At the same time, PREVENT implementing organization FHI 360 has been pursuing a Letter of Agreement (LOA) / Memorandum of Understanding (MOU) with the Government of Myanmar so that PREVENT can conduct additional work under its own clearances.

Avian Influenza Work with FAO

Under the auspices of FAO, PREVENT staff visited Burma/Myanmar in March/April 2013 to:

- Organize and facilitate a FAO-PREVENT Consultative Workshop with the Livestock Breeding and Veterinary Department (LBVD) in Nay Pyi Taw (NPT); and
- Conduct a field visit to the Yangon poultry production zone (PPZ) and selected townships to observe poultry production activities and hold discussions with stakeholders, including: poultry producers, township vets, community animal health workers, Women's Affairs Committee members, and members of the Myanmar Livestock Federation.

FAO/PREVENT Workshop

The workshop, opened by the Minister of Livestock and Fisheries, achieved the following objectives:

- Arrive at a common understanding of the highly pathogenic avian influenza (HPAI) situation and program in Myanmar;
- Understand the types of assistance that FAO-PREVENT can provide;
- Understand risk communication and the key target audiences in the Myanmar HPAI environment;
- Identify needs to mobilize target audiences for risk reduction in the HPAI program; and
- Identify and agree on general activities to be undertaken with FAO-PREVENT support.

There were 28 participants at the workshop: officials from LBVD in NPT (17), Yangon (4), Sagaing (1), and Mandalay (1); and five representatives from FAO, including from the regional office. The workshop featured both technical presentations and breakout work sessions. The breakout work reached the following recommendations:

Target Group	Desired Behavior	Activity
Backyard Poultry Farmers 1,2	Report abnormal poultry deaths	Training; IEC information; peer education
Poultry Collectors and Dealers 1,2,3	Not to sell or buy dead or sick birds; report to LBVD	Awareness campaign
Consumers, Housewives 1,2	Do not buy chickens with abnormal skin color; improved cooking practices	Awareness campaign; entertainment education
Local Authorities – expanded to Township Admin Committee - 1	Mobilize all stakeholders	Orientations
Small, medium commercial poultry farmers + labor 2,3	Early reporting, movement control, disinfection, sanitation, personal hygiene (improved biosecurity)	Peer education, involvement of cooperatives or trade organizations

CAHW 3	Report dead/sick birds to LBVD	Incentives, monthly meetings, sharing of reports
Private sector, gov't vets 3	Share information on HPAI	Monthly meetings
Suppliers of farmers	Observe biosecurity when entering farms	Orientations
Media	Share information	Orientations

The consultative workshop also established the priorities for a Plan of Action, including a primary focus on the Mandalay and Sagaing Regions. The key activities that are to be featured include:

- Training of vets and community animal health workers;
- Orientations for poultry producers;
- Orientations for local authorities (Township Administrative Committee);
- Awareness-raising campaign on food hygiene and HPAI for housewives and consumers; and
- Media orientations.

A POA was drafted following the workshop, with the ultimate goal of reducing and stopping the spread of H5N1 among poultry flocks, thus reducing the risk of contagion to other mammals and humans, and avoiding the possibility of a pandemic. The POA focuses on capacity building on HPAI and risk communication as priority activities to be undertaken for the first year for four key stakeholder groups: 1) local officials; 2) public and private veterinarians; community animal health workers; 3) small and medium scale poultry farmers; and 4) media. It proposes to cover the five target townships of FAO in the Mandalay Region: Madaya, Pyin Oo Lwin, Amarapura, Sintkaing, and Pyawbwe. A key strategy is mobilization of local NGOs – such as the Myanmar Veterinary Association, Myanmar Livestock Federation and Myanmar Women's Affairs Federation – to implement training activities in collaboration with LBVD.

Poultry Production Zone Visit

The field visit to the Yangon poultry production zones included group discussions with township veterinary officers and community animal health workers in Teikkyi and Hlegu townships of Yangon. These townships included 462 and 167 villages, respectively. Following the group discussions, visits to both medium-sized commercial poultry farms in Teikkyi, and two other poultry farms in Hlegu were conducted. Additional meetings were held with key para-statal NGOs, particularly with the Myanmar Women's Affairs Federation and the Myanmar Livestock Association. These local organizations have both structure and extensive membership to provide crucial partnerships for effective interventions. The detailed report of the findings will contribute to the plan of action under development.

Status of Work/Work in the Coming Year:

PREVENT staff presented the POA to USAID Burma officials in May 2013. The officials suggested adding H7N9 activities in the PREVENT Plan of Action for HPAI, at the request of the Ministry of Health. The POA was then submitted to the Minister of Livestock and Fisheries for formal approval, along with a work plan and a corresponding Memorandum of Understanding.

PREVENT was informed that the POA was approved by the Cabinet on October 4, 2013, giving clearances for the work plan period of October 2013 to September 2014.

Financial Results

Australian International Aid funding to the PREVENT project is important and will be increasingly so during the coming two years, with both an eye to long-term investment in the building of verifiable evidence, so that the oft-mentioned “evidence-based” programming might have real evidence in hand, and to the direct engagement with communities.

PREVENT was conceived as a social and behavioral science research project that would spend little at the community level during the first phase of the broader Emerging Pandemic Threats Program. The funding received from Australia has allowed PREVENT to plan an additional final year of work at the community level to address and ameliorate emergent disease risks.

The expenditures during this initial year represent an active phase of preparation, including the wide co-branding of all PREVENT activities in these target countries as equally shared by the Australian government, but have yet to include the more expansive activities planned for the coming two years.

Spending of Australian aid funds has been growing incrementally due to ramp up of activities in this first year, the coming year is expected to expand in terms of progress on Australian Aid goals and objectives.

The following pages provide financial reporting for the past year.