Conference on

Mitigating Greenhouse Gas Emissions from Livestock and Agro-Industrial Waste

15 to 16 October 2009 | The Peninsula Manila, Philippines

Co-Organized by:

Department of Environment and Natural Resources

Department of Science and Technology

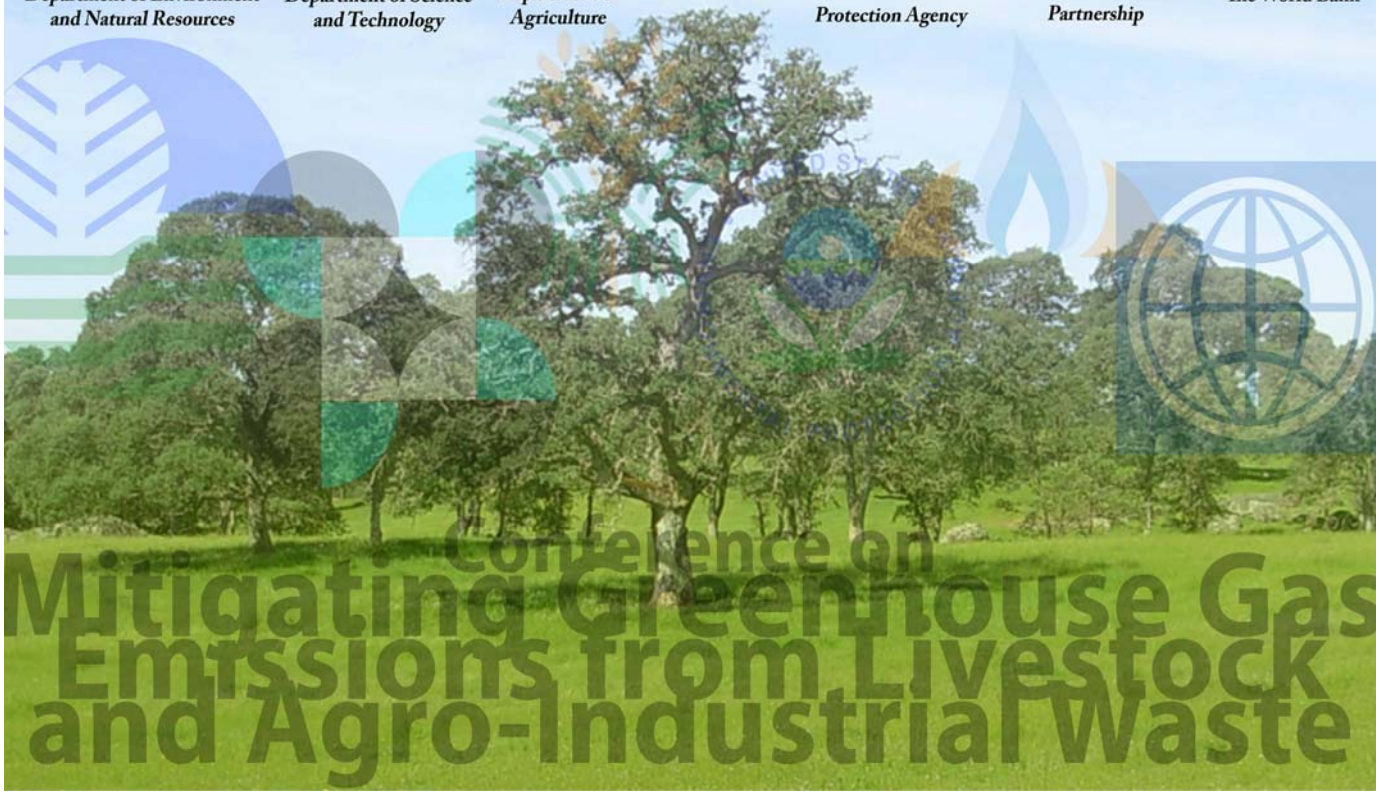
Department of Agriculture

In Cooperation With:

US Environmental Protection Agency

Methane to Markets Partnership

The World Bank



CONFERENCE ON MITIGATING GREENHOUSE GAS EMISSIONS FROM LIVESTOCK AND AGRO-INDUSTRIAL WASTE

15-16 OCTOBER 2009
THE PENINSULA MANILA, PHILIPPINES

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Executive Summary

The Conference on Mitigating Greenhouse Gas Emissions from Livestock and Agro-Industrial Waste was held last October 15-16, 2009 at the Peninsula, Manila, Philippines. The Conference was co-organized by the Department of Environment and Natural Resources (DENR), Department of Science and Technology (DOST) and the Department of Agriculture (DA). It was supported by the World Bank and the Methane to Markets Partnership Program of the United States Environmental Protection Agency (USEPA). There were a total of 181 participants, speakers, panelists and exhibitors who attended the conference. In the two-day conference, carbon emission programs and opportunities for emission reduction in the livestock and agro-industrial sectors were discussed. There was a sharing of lessons learned and experiences from the developers, auditors and project aggregators among participants. Difficulties, concerns and other technical and financial issues were discussed, and ways on how to handle and manage them were given by the resource speakers through case studies, and based on the actual projects that are being implemented in the Philippines and other countries. New steps on carbon emission reductions such as the streamlined process of the Programmatic CDM and other possible developments that will arise after 2012 or the Post-Kyoto initiatives were identified. The conference ended with a challenge that everyone should participate and play an active role in the battle for climate change especially in reducing carbon emissions.

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List of Acronyms

BAI	Bureau of Animal Industry
BOD	Biochemical oxygen demand
CDM	Clean Development Mechanism
CER	Certified emission reduction
DENR	Department of Environment and Natural Resources
DOE	Department of Energy
DOST	Department of Science and Technology
EMB	Environmental Management Bureau
ERDI	Energy Research and Development Institute
GHG	Greenhouse gas emission
ITDI	Industrial Technology Development Institute
LGU	Local government unit
LLDA	Laguna Lake Development Authority
M2M	Methane to Markets Partnership
PCIERD	Philippine Council for Industry and Energy Research and Development
PoA	Program of Action
WB	World Bank
WTF	Wastewater treatment facility
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency

I. Background

Introduction

At its first session of the Meeting of Parties of the Kyoto Protocol, the concept of "Programs of Activities" (PoA) was introduced as a variation to the single project implementation of the Clean Development Mechanism (CDM). It basically works as a programmatic approach to developing carbon reduction initiatives where, instead of registering projects one by one, programs can now be developed which will enroll generic projects as a group. PoAs have been applied for biogas flaring, composting, efficient lighting, run-of-the-river hydropower, solar home systems and solar water heating among others. The application of PoAs is an opportunity to overcome the barriers to a wider participation in the trade of Carbon Emission Reduction (CER) or Carbon Credits. The single-project oriented regulations of the CDM involved high transaction costs and the need for complex organizational performance structures which prevented interested entities from pursuing these Greenhouse Gas Emission Reduction projects. Small generators of Greenhouse Gases did not participate in the CDM market due to the high transaction cost. The PoA approach promises to widen the reach of CDM and achieve higher levels of GHG reduction in the country.

A study conducted by PA Consulting and the Eastern Research Group in support of the USEPA Methane to Markets Partnership Program (M2M), identified sources of methane reduction potential in the Philippines. The top three sectors with the highest potential are power, transport and waste management. The assessment showed that the top four sub-sectors in waste management are piggeries/swine farming (61,509 MT CH_4/year), alcohol distilleries (16,158 MT CH_4/year), desiccated coconut processing (3,472 MT CH_4/year), and slaughterhouses (426 MT CH_4/year). This shows the high potential in the management of waste from the agro-industrial sector. Combining the PoA approach with waste management for the agro-industrial sector will target a large sector of small and medium scale industries/entities which would previously not have benefitted from the Clean Development Mechanism.

Objectives

- Take stock of the country's experience with the Clean Development Mechanism (CDM).
- Increase awareness of the PoA concept and the important role which the Methane-to-Markets Partnership contributes to its success.
- Discuss issues and concerns to the development of PoAs.
- Formulate innovative ideas for new types of PoAs.
- Formulate PoA approaches that include spin-off funds for development of poor communities
- Promote the use of PoAs for reducing emissions in the rural and urban setting.
- Introduction of current PoAs under development and discuss ways of how the various stakeholders can participate and benefit from these PoAs.
- Discuss how government and public agencies can promote the use of PoAs to support their development objectives.

Day 1 Proceedings

II. Day 1 Proceedings

9:20AM – 5:00PM
15 October 2009
Rigodon Ballroom
The Peninsula Manila

Summary:

The opening ceremonies, conference overview and messages of guest speakers focused on issues on climate change and weather disturbances that affect the Philippines and the rest of the world. The Conference on Mitigating Greenhouse Gas Emissions from Livestock and Agro-industrial Waste was very timely after the onslaught of typhoons Ondoy and Pepeng. It stressed the mitigating measures and adaptation technologies for combating the impacts of climate change. Resource persons from the government, financial institutions and foreign delegates with experiences on CDM projects talked about opportunities to reduce methane in the livestock, agro-industrial and food processing waste sectors, and technologies currently being used with emphasis on anaerobic digesters, some carbon emission reduction programs of the government and financial institutions like World Bank and Land Bank of the Philippines. The institutional mechanisms and the processes involved in CDM were discussed. Lessons learned and experiences were shared by foreign delegates from BSP Nepal and ERDI, Thailand. Difficulties of small scale projects such as piggeries and slaughterhouses in qualifying for CDM and certifying such projects were noted. Bundling of projects of the programmatic CDM or PoAs were introduced and given emphasis during the conference. Uncertainties after 2012 were also mentioned but organizers of the conference assured delegates that the conference is just one of the venues to disseminate information and updates in CDM and other matters arising after 2012.

Session I. Overview of Carbon Emission Reduction Programs

Session I was chaired by **Ms. Joy Goco** of EMB-DENR. Speakers were **Engr. Raul Sabularse** of PCIERD-DOST, **Undersecretary Mary Ann Lucille Sering** of DENR and **Mr. Bert Hofman** of World Bank who talked about Philippine Opportunities to Reduce Methane in the Livestock and Food Processing Wastes Sector, Philippine Climate Change Agenda and Programs and Clean Development Mechanism: How it Works and the New Carbon Finance Instruments (Post-Kyoto), respectively.

Engr. Sabularse introduced the Methane to Markets Partnership Program in the Philippines, which dealt with greenhouse gas emission reduction, and what is being done to increase awareness on emission reduction opportunities; also discussed were resource assessment, organizational and funding arrangements between partner countries, as well as expectations and challenges for the partner countries like the Philippines.

Usec. Sering introduced the Clean Development Mechanism and the various entities tasked to implement projects meant to reduce greenhouse gas emission; she covered the CDM Project Activity Cycle and showed the various activities and the corresponding government and private sector entities involved in each stage of the project; she also explained how the CDM program operates under the Kyoto Protocol. She gave some

statistics on the current projects, including status of each in the project activity cycle. Also covered were national and international issues which affect the implementation of projects, including efforts needed in order to achieve the objectives of CDM.

Mr. Joe Tuyor presented the CDM from the point of view of the World Bank, covering among others, the Kyoto Protocol, the carbon market trade, CDM-eligible emission reductions, the CDM project cycle, CDM institutions and documents and the programmatic approach to CDM projects. He also presented the post-2012 scenarios, specifically on the financial aspects and partnership arrangements.

Session I Open Forum:

Question	Response
Ms. Mila Jude of SEEDLinks Philippines sought information regarding coal mining, specifically flaring of coalbed methane (CBM), apart from power production, as CDM projects; she added that there are already a lot of registered projects abroad which just flare the methane rather than convert it into power. Flaring converts methane to a lesser evil that is CO_2 thus, an emission reduction.	**Engr. Raul Sabularse**, PCIERD-DOST noted that CO_2 from methane reduces the impact on the environment because when you convert the methane to CO_2 you can reduce your emission since methane is 21 times more potent than CO_2 in terms of global warming potential (GWP).
Mr. Miguel Zosa, LGU Tacloban City asked Usec Sering how the DENR can assist hog raisers in the provinces who are backyard farmers, specifically on organizing them to minimize waste disposal and avail of the incentives for LGUs without going through circuitous processing mentioned by the World Bank representatives.	**Ms. Mary Ann Lucille Sering**, DENR Undersecretary said that the Department is encouraging programmatic activities; small-scale projects such as hog raising and piggeries can be bundled together and registered as one. The DENR can help provide information on existing consolidated piggery projects but the DENR cannot provide financing to LGUs. However, the Department can help in identifying entities which can, including the World Bank. She pointed out to the League of Cities for identifying projects that can qualify under the Program of Activities (PoAs); and that the League of Cities or Municipalities can be identified as possible consolidators. **Mr. Joe Tuyor** of the WB, in turn, pointed to Land Bank because they are developing a program in pig waste.

	Engr. Raul Sabularse of PCIERD-DOST said that they have a booth and have supported a database on biogas which can be looked into to find out anybody nearest to one's place with the technical expertise on biogas who can be contacted. **Ms. Mary Ann Lucille Sering** DENR Undersecretary reminded them (LGUs) to update the DENR on the progress of their discussions with Land Bank and other entities so the department can continually monitor their project and make sure it happens.
Mr. Joselito Osete, LGU Navotas said that they are operating a sanitary landfill; he asked if flaring is environmentally acceptable because it is being done in sanitary landfill to mitigate methane emission; also, what is the minimum volume of waste to have a viable gas recovery project that can be implemented.	**Engr. Raul Sabularse,** PCIERD-DOST reiterated that burning methane into CO_2 will help since methane is 21 times more potent as a GHG; if methane cannot be captured (to be converted to power), it can be flared to CO_2. The cost of methane-to-power may be restrictive and uneconomical and there is no definite answer to how much volume is needed to make a landfill viable. He said that a study would be necessary; the economics will depend, among others, on location, technology and the source of raw materials (waste). He suggested that experts in the exhibit booths could surely help on the question of minimum amount of waste. **Ms. Mary Ann Lucille Sering**, DENR Undersecretary added that, as a matter of policy, we want to get rid of CO_2 in the air; since the Philippines is not actually required and we are doing this voluntarily, by doing flaring we are choosing a lesser evil since methane is as mentioned 21 times more potent. We are just reducing its potency by converting it to CO_2. Usec Sering stressed that carbon credits from CDM do not finance the entire project; it is just incremental. Engaging in a landfill project just for the carbon credits will not suffice (for financing); but the landfill is generating and emitting methane and that has to be addressed; any financial benefits from CDM is just incremental.

	Mr. Joe Tuyor of the World Bank added that CDM does not finance the investment; it only purchases the emission reduction generated from the project; but it does improve its viability. Financial internal rates of return (FIRR) of those projects that factored in CDM have actually increased because of the CDM money. **Ms. Elisea Gozun**, Chair cited the methane capture project of Payatas Controlled Dumpsite. Payatas has been around since the 70's. It is estimated that 10M tons of wastes were disposed in the old dump mound and in the new mound and the CERs are 110k tons CO_2 equivalent per year over a 10 year period. Payatas is a standalone project. Ms. Gozun also cited the Montalban landfill gas capture, which generates about 5.8 M tons of CO_2 equivalent per year. However, while Payatas and Montalban are landfills receiving very big volumes of wastes, smaller controlled dumpsites like Zamboanga, with a population of 750 thousand, and General Santos City, which has half a million, cannot be standalone CDM projects; so they have to be bundled or considered under the programmatic approach where they will be packaged as PoAs. Three areas – piggery farms and slaughterhouses, methane capture from dumpsites and energy efficiency for public street lightings and buildings – have been identified for PoAs.

Usec. Mary Ann Lucille Sering of the DENR cited the importance of bundling or programmatic approach as a post-Kyoto agenda because of the potential projects that can be generated under the M2M program. She identified the piggery sector, which is already well established in terms of location, size and proximity to each other; although the technology and required financing still need to be addressed, CDM is a good way to augment financing and improve technology, particularly in reducing odor. She also cited the case of distilleries which are concentrated in the sugar producing areas; again, she noted that technology still needs to be addressed so international standards are met. Project proponents have to get help from government negotiators in terms of bundling and PoAs to be able to be competitive with big countries like China and India.	**Ms. Joy Goco** of the EMB-DENR noted that the program of activities is already being implemented by the CDM executive board so it is no longer under negotiation; it is a done deal already that they are accepting PoAs. She said that there are countries already that have submitted their projects with the CDM Executive Board and one of this is Mexico. In the Philippines, we are trying to develop one and the intent of this conference is to encourage the development of PoAs. **Mr. Joe Tuyor** of the World Bank encouraged participants to attend Day 2 session for colleagues from Thailand will be sharing their experiences on PoA on pig waste which the Philippines can also do.
Mr. Roberto Calida, XLS Services and Management Inc. noted that FIRR of projects are enhanced by the CDM. He wanted to find out if it is the DENR office that is doing the calculations; if there is information available online; and, if there is a template that can help them estimate potential CERs.	**Usec. Mary Ann Lucille Sering** of the DENR answered that when you want to know these things, you normally hire a CDM consultant to give you an idea how you can factor in the potentials of carbon credits into your project. As to whether there is a template you can look at the projects that have been submitted to the DENR, if it is similar to yours, so you can have an idea; otherwise, you may have to require a CDM consultant. **Mr. Joe Tuyor** of the World Bank clarified that globally, FIRRs have increased in projects that have accessed carbon credits through CDM – sanitary landfills, renewable energy, and wastewater treatment systems. On the question if there is a template or not, Mr. Tuyor said that there has to be approved methodology of the project. The UNFCCC executive board has already detailed these out and that includes the calculation of ERs. If one is planning to put up, say, a wind farm, he/she can just look up the formula and obtain the information on the project; try

	calculating and make some rough estimates on the FIRR. **Ms. Elisea Gozun** said that for all the CDM projects that have approved formulas, the methodology is all in the website of UNFCCC; there is also the list of all approved projects. All the approved projects have the PDD (project design document) one can refer to if one's project is similar to the one that is approved. There is the need, however, to engage the services of an expert, especially if one are doing this for the first time. **Mr. Marcelo Labre** of Standard Bank cited the website where everything about methodologies can be found – cdm.unfccc.int. He said that there are several methodologies available, but if one has an idea of something that can be used, it can also be developed and proposed. One can propose a new methodology but there is a whole process one has to follow to submit a new methodology for reducing those emissions. **Ms. Elisea Gozun**, Chair, added that a project proponent could also develop a new baseline methodology; but it would take some time because it has to be reviewed by the methodology panel. She said that to facilitate the process, project proponents are advised to use the baseline methodology in calculating the project ERs. Aside from the PDD, she said that in the Philippines, project proponents and developers are required to prepare the sustainable development benefit description, the proof of legal capacity, the documentation of the stakeholders' consultation, and, if needed, an ECC or certification of non-coverage.

Ms. Mercedes Cabling of Cabanatuan City Solid Waste Management Board shared their findings in a research study which showed on technology transfer, specifically on biogas technology in Nueva Ecija, where only 25-30% of projects that started pushed through with small-scale biogas production technology; she said that some operators feared of a Glorietta 2 Ayala explosion and other misconceptions about biogas; she asked how these can be addressed, especially with the assistance of the provincial DOST?	**Engr. Raul Sabularse** of the PCIERD-DOST said that under the M2M initiative, there is a draft protocol in assessing performance of biogas systems and it is hoped that this could be adopted soon so that we can take a look on how our local designs perform; there is a need for quality control; standards to make sure that it's safe and performs as promised. Mr. Sabularse pointed out that there was an earlier presentation that showed that some of these are not performing as designed; that quality standards are very important and a draft protocol has been initiated under M2M and hopefully this will be approved and utilized by the Department to check performance of our own systems and could help in the future designs. **Ms. Marina Mallare** of the Ateneo School of Government shared a project it is currently implementing with the DENR that offers free technical assistance with regards to CDM; she gave the entity's email – cdm.asog@gmail.com – for more information about CDM, estimation of potential emission reduction, or methodologies.

Ms. Joy Goco of the EMB-DENR ended the session with the reminder for those who want to approach the speakers – they will be here the whole day and be available for bilateral talks.

Ms. Elisea Gozun made an announcement that lunch will be at the Conservatory at the second floor of the hotel; a group picture of the participants and speakers would be taken at the stairs.

Session II. Case Studies on Bundling of Projects

Session II was chaired by Ms. Carmencita A. Bariso of DOE. Mr. Prakash Lamichhane of BSP Nepal, Ms. Pongtip Puvacharoen of World Bank, Ms. Lennie Santos-Borja of LLDA, Josefina Ramos of Land Bank of the Philippines talked about Nepal Biogas Project - A Case of Bundling of Projects for CDM funding, Thailand Pig Waste Program, Philippines Laguna de Bay Community Composting Project – Bundling LGU subprojects and Land Bank of the Philippines Pig Waste and Landfill programs, respectively.

Mr. Prakash Lamichhane shared their experience on biogas in Nepal, including statistics, the history of biogas technology application, the CDM process; he elaborated on the various problems and struggles, including procedures adopted in the programmatic approach to CDM projects.

Ms. Pongtip Puvacharoen presented Thailand's Pig Waste Program, specifically carbon finance projects supported by the World Bank. She highlighted the benefits of a bundled CDM projects through programmatic CDM; how the small farmers have benefited from the bundling; how they were able to become eligible for the program; and how emission reductions were calculated. She also pointed out the important role that the coordinating agency takes in the entire process.

Ms. Lennie Santos-Borja shared their experience in CDM by presenting the Laguna de Bay Carbon Finance Project (Carbonshed Project) and the Laguna de Bay Institutional Strengthening and Community Participation Project (LISCOP). She gave some statistics, organizational and functional arrangements, and the bundling of MRF and composting projects, watershed rehabilitation and methane recovery in wastewater treatment.

Ms. Josefina Ramos presented the Pig and Landfill Programs of the Land Bank and elaborated on how it was helping, in terms of financing, with its Carbon Finance Support Facility (CFSF). This facility included credit lines, project development funds and internal funding programs for environmentally-related projects.

Session II Open Forum:

Question	Response
Mr. Kurt Roos of the Methane to Markets Program asked Ms. Josie Ramos of the Land Bank how new facilities are captured under the program, specifically, distilleries and slaughterhouses. What would be the process to mobilize that under the PoA?	**Ms. Josefina Ramos** of the Land Bank of the Philippines cited the Carbon Finance Support Facility which covers landfill, animal and municipal wastes, and mini-hydro projects. They are currently looking at distillery projects but don't have the technical expertise in considering distillery projects as part of their program for the PoA. She said that it is a good start to know that and they will be needing the assistance of the World Bank in the development of the PoA for distilleries.
Ms. Marina Mallare of the Ateneo School of Government asked Mr. Prakash Lamichhane of BSP Nepal how they were able to finance the distribution of the biogas to the recipients because she saw that in almost all the presentations, like that of Ms. Santos of LLDA, they were able to get grants and technical and financial assistance from the	**Mr. Prakash Lamichhane** of BSP Nepal noted that in the development of the biogas projects from 1955 to 1992, donations came from various donors – SNB Netherlands, KFW German and the Nepal Government. The money was put in one basket fund and from there the program was run by private and public partnerships; a government body

World Bank; the same was the case with Thailand's ERDI and Land Bank, where they were able to get some form of assistance in terms of developing CDM or programmatic CDM. So she assumed that in the project development, and even in the distribution, there was some form of assistance; was this at no cost to the recipients, or was it amortized?	provided the funding and BSP Nepal, an NGO, implemented. He described how the company or an NGO introduced the technology, how it was financed and how it will be amortized. He cited further that the development funding was covered by a contract and the subsidy is about 20% of the total costs of the biogas plant. After completing the installation, gas was produced and this was checked by BSP Nepal for documentation and reporting, after which the subsidy was released. The subsidy was coursed through BSP Nepal and not directly to the individual participants; the company's other roles included verification of installation and compliance according to the contract. A reward and penalty ("carrot-and-stick") system is in place for compliance purposes, including incentives for BSP Nepal. Mr. Lamichhane, who attributed the success of the scheme to its being demand-driven, noted that the subsidy is in cattle dung and sewage but not in pig and poultry projects; finally, he mentioned that biogas plants are not only for power generation but also for purposes of sanitation, which is a problem in their country, specifically in the western part of the country where malaria and diarrhea are prevalent. He said that biogas can play a very good role with CDM credits to boot.
Mr. Miguel Zosa of LGU Tacloban assumed that once Land Bank would have approved the project for financing, they have already identified the Carbon Credit revenues. His question was: Can the credits be credited to the LGU as part of its equity in one's debt-to-equity ratio and NPV determination?	**Ms. Josefina Ramos** of the Land Bank said that the Bank evaluates project loan proposals with the recognition of CERs as additional revenue streams that would improve the IRR of the project; these are accepted as collateral in the form of assignment of rights or issued proceeds of CERs. She was not sure if these (credits) can be part of LGU equity.
Ms. Carmel Gacho of the ITDI of DOST noted that the Department has just formed a technical working group together with the local government units to look into the biogas digesters: on how they can be	**Mr. Prakash Lamichhane** of BSP Nepal noted that what he presented was only at house level biogas plant; integrated systems like the DEWATS can be used to treat water. But he cited that this technology has a cost

complimentary with regards to CDM, specifically how they can be integrated with wastewater treatment because biogas technology does not reduce COD and pollutants and these fail water quality standards. She asked whether the discharges that come out of the biogas are used as fertilizer; that is, the sludge can be used for its organic matter content. That's why the Department is also packaging technology to be integrated with other polishing treatment steps; is this being practiced in Nepal?	and can affect maintenance and sustainability of the system. Mr. Lamichhane noted that they are just into biogas technology which can handle sludge; wastewater is handled by other experts and is diverted to the reed bed or elsewhere where it is processed. Just the same, he stressed that the biogas technology they are promoting does not cost much and it is just the willingness of the people that is needed to adopt it; he also cited the need for changing the mindsets of politicians to be able to accept the technology.

Ms. Carmencita A. Bariso of the DOE closed the session and thanked the organizers for inviting her to chair this particular session.

Session III - Anaerobic Digestion in the Global Context

Session III was chaired by **Engr. Raul Sabularse** of PCIERD-DOST, **Dr. Poon Thiengburanathum** of ERDI Chiang Mai University and **Mr. Paul Puthenpurekal** of SURE Philippines talked about the Technologies and Programs in Thailand and the Anaerobic Digesters in the Philippines, respectively.

Dr. Poon Thiengburanathum gave a detailed description of biogas technology currently in use in Thailand, particularly anaerobic digestion; he presented some statistics, history and experiences in the biogas sector; then he covered in great detail the following: biogas basic designs, operations, pre-treatment of waste and post-treatment of wastewater, gas utilization technologies; finally, he enumerated the lessons learned from their experiences.

Mr. Paul Puthenpurekal discussed anaerobic digesters in the Philippines; he presented a brief history then proceeded to current developments, existing installations, areas and modes of development, some economics of anaerobic digesters; finally, he presented an approach for low-carbon development model that can be adopted by the LGUs.

Session III Open Forum:

Question	Response
Mr. Kurt Roos of the Methane to Market Program asked that if one had exactly the same 10 tons of waste and put 10 tons in the Thailand system and 10 tons in the SURE system; which one would produce more gas? Or do they make the same amount of gas?	**Dr. Poon Thiengburanathum** of ERDI said that even if technology varied but the conditions were the same, we would get the same amount of gas per cubic meter of waste; whether one provides a bigger lagoon with a low-cost system, CSTR (continuous stirred tank reactor, a very high technology), etc., the resulting gas will be the same if the conditions are the same.

	Mr. Paul Puthenpurekal of SURE Philippines, Inc. agreed with Dr. Poon regarding getting the same amount of gas. He said that designing the system based on the revenue source, whether it was gas for power generation or for fertilizer; if it was for power, then definitely one would want to maximize the gas production. But if the revenue model is a mix between power and fertilizer, one may not want to digest everything and leave some organic value for the fertilizer part. Mr. Puthenpurekal noted that developments in biogas technology in Thailand and the Philippines are similar because the conditions are almost the same; economic criteria, like costs, are practically the same. He cited the case of digesters, where documentation has been done for the last 5 to 10 years, but where the Philippines is just beginning now; he said that there's an advantage in exchanging notes and learning from them.
Mr. Gerry Parco of the World Bank asked about process upset; particularly, on the methanogenic phase, which is the rate-determining step in the anaerobic process, being the most sensitive and which has to be totally anaerobic and not facultative. He inquired if, in the pig anaerobic digesters scenario, there have been any instances of process upset where it doesn't proceed to the methanogenic stage because of some inhibitory chemicals; why it happened and how long it takes to bring it back to a steady state.	**Dr. Poon Thiengburanathum** of ERDI cited a low failure incidence in swine biogas unit because of the baffle system; but he said sedimentation and oxidation are the two main causes of process upsets. Dr. Poon mentioned that these have been addressed, especially for being able to re -circulate and maintain the sludge. **Mr. Paul Puthenpurekal** of SURE Philippines, Inc. noted that in the Philippines, where most of the farms have covered lagoons and large digesters, the issue is sedimentation over a period of time and not so much the organic issue. Also, he said that when it comes to tank digesters or smaller systems, farm-wide vaccination programs upset the system and take three weeks, at least, for the gas production to come back to normal; so, whenever there is a vaccination program, the operator of the biogas digester system has to be informed by the farm management that there is an antibiotic process and it will affect the gas production. He also noted that if one operates in a

	thermophilic condition, there is a need to continuously monitor the various parameters; otherwise, the imbalance may happen very quickly without one knowing it. **Dr. Poon Thiengburanathum** of ERDI mentioned shock load as another factor in system upsets but this is addressed by large baffle zones of the system and recovery can be in less than seven days; the Philippines, like Thailand, is a warm country and recovery is easy.
Mr. Arnel Amparo of San Carlos Bio-Energy mentioned that theirs is a distillery plant that processes sugar cane juice that converts to ethanol and the anaerobic process has been adopted to extract methane from the slops and use the methane as supplemental fuel for their boilers; their objective is how to maximize the production of methane from slops. His question was: What are the driving factors to increase the efficiency of the anaerobic process and convert this to methane as much as possible?	**Dr. Poon Thiengburanathum** of ERDI cited his experience from the ethanol plant in Thailand with regards to maximizing gas production; that is, to increase retention time as much as possible; provide mixing into the system; and use of microbes. But he cited that these mean additional costs and the benefits have to be weighed against costs; difficulties in operations and the need for specialists. It will cost around 5% of the total gas produced to maximize gas production where current levels are at 50% to 60%. Dr. Poon reiterated that it will have to be a balance between design and operating costs. **Mr. Paul Puthenpurekal** of SURE Philippines, Inc. thought that Dr. Poon is absolutely right; he said the choice is between the total potential and what one is getting out of that right now; normally plants are already in a steady-state condition and in order to further improve gas generation, one has to monitor operating conditions over a period of time, either through one's own laboratory or in tie-up with nearby laboratories. Mr. Puthenpukeral cited several theoretical ways of increasing the gas volume: increasing the temperature or increasing tank volumes; but again these have to be measured against entailed costs; it's more now of a techno-economic discussion rather than just an idea of getting maximum gas. Sometimes you may already be operating at 80% gas efficiency and it's not worth going after the 20%.

	Dr. Poon Thiengburanathum of ERDI cited another strategy, that of pre-treatment before the anaerobic conditions. **Mr. Prakash Lamichhane of** BSP Nepal shared their experience in Nepal in relation to Mr. Amparo's question on increasing gas production. He cited several ways: increasing volume of the digester, stirring to hasten methanogenic reaction and re-circulating the slurry to activate incoming waste. But again, he pointed out that regarding mechanical stirring, current technologies are designed so that the stirring action becomes automatic; longer retention time is another possibility but again this will entail cost.
Mr. Edgar E. Erlano, the Slaughterhouse Manager of Sorsogon City, became interested in constructing a biogas operation upon learning that Marulas already had theirs; however, they hesitated to construct for two reasons: their waste output is small and they were afraid that their design will fail; in this regard, he asked what is the best design that is easy to manage because they do not always have the technical people present; they are afraid of gas explosions and other operating problems	**Mr. Paul Puthenpurekal** of SURE Philippines, Inc., to illustrate the operation of the anaerobic digester, gave an analogy of the human stomach; that is, food that is taken in, after digestion (and absorption of nutrients) becomes waste, which has to get out of the body. The digester will fail if nothing goes out after a period of time. In the case of septic tanks in the city, he cited that maintenance people come and clean the septic tank after a year or two years; the only reason that a digester will fail is either it's not air-tight or water-tight or it's just full; it has to be de-sludged; otherwise, it will perfectly work as an anaerobic digester. The technology is not rocket science and is basic. Similarly, he said, slaughterhouse operation is very simple and advice is available from various companies and designs can be acquired for free; there is an on-going project with the WB and some NGOs which provide that kind of services. Mr. Puthenpurekal recommended visiting the BAI facility in Valenzuela City in Bulacan for training and other information, including housekeeping, managing both the slaughterhouse and waste produced by it, recycling, etc.; it has been operational for the past three years and as an example of success that must be replicated.

	Engr. Raul Sabularse of the PCIERD-DOST got one last comment from the Chair Ms. Elisea Gozun. **Ms. Elisea Gozun** reiterated that it is not difficult to maintain digesters and this is being done even in Gawad Kalinga communities; but managing wastewater is and must be done in accordance with the Clean Water Act. Wastewater discharge is more difficult to manage and one of the reasons why most of our rivers where we have concentrations of population pollution are polluted, is because we have completely forgotten about sewage and other wastewater. Unlike solid waste which we can see, most wastewater is underground. Cleaning wastewater also contributes to the solution of a global problem like climate change; in some instances, like in slaughter houses and even at the household level like what they have demonstrated in Nepal, we even have the benefit of having the methane converted into cooking gas; there are many advantages and the cost is really very minimal. Ms. Gozun cited her role as a convenor for the Philippine Climate Change Imperative, promoting this (cleaning wastewater) with the League of Cities and she hopes that Sorsogon will also sign up; so far there are already 32 cities who want to do it for their slaughterhouses and their markets. She urged the inclusion of biodegradable market wastes, including waste from public toilets. Finally, she reiterated that operation of the digester is easy but it has to be done properly; otherwise, it can still fail. **Engr. Raul Sabularse** of the PCIERD-DOST wanted to end the session but not before another question was asked by a participant.

Mr. Jaime Dilidili of the Cavite State University expressed two concerns: the minimum requirements in order for a project to qualify, and the shortening of the retention period for the anaerobic digestion to complete. We know that the fermentation period could take as much as 40 to 60 days but the retention period is directly associated with the cost of the installation of the digester. Mr. Dilidili also asked about enzymes and biotechnology or microbiology: if there are already enzymes that could reduce the retention period without sacrificing the benefits that we can derive from anaerobic digestion, the gas potential and other environmental benefits.	**Dr. Poon Thiengburanathum** of ERDI cited the main criteria for a project to qualify for carbon credits. In order for a project to qualify, it should be feasible and there should be an intention to reduce methane emission. Before construction of the project, the CDM intention should be there. For example, existing projects with already covered already lagoons because they are required to have covered lagoons, then they are no longer qualified. Regarding enzymes, Dr. Poon shared their experience and noted that it is a significant cost for biogas management and biogas operation. The cost of the enzymes is very high, so the present enzymes we have are not financially feasible. **Engr. Raul Sabularse** of the PCIERD-DOST ended the session, noting that it has been a very interesting one and thanked everyone for their active participation. He solicited some applause before handing the floor to the Conference Chair, Ms. Gozun.

Ms. Elisea Gozun thanked Raul and everyone for staying for the sessions and hoped they all come back for the sessions the following day. There will be three technical sessions: looking at opportunities in the Philippines for reducing methane emissions in the pig sector; case studies of reducing methane emissions in the agro-industrial sector; and the list of projects under the Program of Activities of the World Bank.

Ms. Gozun asked applicants for the program; to fill up the form provided to them to express their interest. No matter how small one is she said we are targeting programmatic CDM whereby small and big facilities can be joined together to be attractive so each can get the credit or value for what one generates that is the beauty of programmatic CDM.

Ms. Gozun again thanked everyone for joining and, for those who are really serious and thinking about CDM, she asked them to maximize their participation and forge possible agreements with all the exhibitors and agencies present. She urged everyone to be prompt for the 9:00 am start the following day so the sessions can finish early.

End of Day 1

Day 2 Proceedings

III. Day 2 Proceedings

9:15AM – 5:00PM
16 October 2009
Rigodon Ballroom
The Peninsula Manila

Summary:

A recapitulation of Day 1 sessions was done by Ms. Elisea Gozun, Chair of the conference. There were 3 sessions for Day 2: Philippine opportunities for reducing methane emissions in the pig sector; Philippines case studies for reducing methane emissions in the agro-industrial sector; and overview of a new Philippine methane reduction program specifically in the livestock and agro-industrial waste sector.

Panel discussions centered on the opportunities for reducing methane emissions: the methodology, modalities and mechanisms in qualifying PoAs. There was a sharing of experiences of the project developers, auditors and aggregators. The initial lists of projects where local government units and other agencies can participate and play active role were identified. The next steps as derived from the exchanges, issues, concerns and interaction of participants of the conference were outlined and presented.

Session IV. Philippine Opportunities for Reducing Methane Emissions in the Pig Sector

Session IV was chaired by **Ms. Elisea Gozun**. Panel members were **Mr. Christian Alvarado** of Phil Bio Sciences Co., **Dr. David Robins** of the Philippine Sanitation Alliance, and **Dr. Poon Thiengburanathum** of ERDI Chang Mai University, Thailand. The session started at 9:30 AM and ended at 10:35 AM.

Mr. Christian Alvarado presented Phil Bio Sciences Co.'s CDM activities as a unit of Asia Biogas Co., Ltd. These included waste-to-energy projects, sewage treatment plants, and climate-friendly cities. He also described how the company gets into partnerships in funding carbon trading endeavors and enumerated projects which it designed, built and operated.

Dr. David Robins gave a presentation on the important role of the local government unit in the promotion of appropriate wastewater systems in conjunction with hog raising, slaughterhouse operations and market waste managements. Being more open than private entities, the LGU can be a good model in the planning, financing, development and implementation of wastewater systems in compliance with sanitation, health and environmental laws. They have the capability of providing an environment that can bring public and private sector interests together, including appropriate wastewater systems.

Dr. Poon Thiengburanathum described the programmatic approach to implementing CDM projects that is being done by ERDI. He presented some statistics and funding and subsidy issues. Further, he elaborated on the design of programmatic CDM, institutional frameworks, characteristics of the PoA, risk assessment, technology selection, eligibility criteria for projects, and some project management aspects like monitoring. He also pointed

out some keys to a successful project and risk-reduction strategies and other innovative ways which they applied in Thailand.

Session IV Open Forum:

Question	Response
Mr. Gerry Parco of the World Bank commented on Dr. Poon's presentation, particularly on the participative nature of ERDI in dealing with individual CPAs. Mr. Parco also noted the use of 0.3 tons CO_2 per year per pig vs. the 0.7 that they have been using in computing for the potential gas generation and corresponding credits for ERs, which leads to an overestimation. Mr. Parco's first question was whether the maximum size of 20 kgs for pigs in the Philippines as roasted pigs ("lechon"), compared to 60 kg in Thailand would affect the calculation for gas generated.	**Dr. Poon Thiengburanathum** said that on the question on pig size, the practice in Thailand is to grow them for meat, up to more than 100 kg but averaging 60 kg. The number they use is 0.30 to 0.40 tons CO_2 per pig, where the lower limit is the one used for estimation. **Ms. Mila Jude** of SEEDLinks added comments on the previous question: she said that, in the methodologies of the Intergovernmental Panel on Climate Change, one can see all the details of what Mr. Parco was asking regarding the weight of the pig. There is a corresponding dry matter, produced gas per weight of waste, annual waste produced per pig, etc. She expressed her appreciation for the 0.30 tons value for the equivalent CO_2 emission reduction, as they have been using 0.50 in their estimations. **Mr. Kurt Roos** of the Methane to Markets program of US EPA clarified what numbers to use. He noted that different farms (sow, swine or finishing) have different emission factors; that one has to go back to one's baseline waste management system since the numbers are very variable.
The second question of **Mr. Parco** was regarding the three categories of projects vis-à-vis the revenues they receive out of the potential gas generated; whether they get less credits if the project is more risky.	**Dr. Poon Thiengburanathum** noted the categorization of projects with respect to their risk profiles – Class A projects are clean & clear and understand the concepts; Class B projects, on the other hand, may not be as clean and clear but can be improved by capacity-building, increase of facilities, even motivation, to convert them to Class A. **Ms. Elisea Gozun** wanted to be clarified on Dr. Poon's remarks on the risk management

	strategy; on the identification of projects, their assessment, and the level of work done with them, depending on the risk profile, as part of the programmatic or part of the CPA. She noted that the second question dealt with the amount of revenues whether they were based on risk or on the amount of contribution to emission reduction. **Dr. Poon Thiengburanathum** of ERDI said that once qualified, revenues will depend upon the emission reduction.
Mr. Gerry Parco also asked Mr. Dave Robbins of the Philippine Sanitation Alliance how the dome of the digester can be gas-proofed.	**Mr. David Robbins** of the Philippine Sanitation Alliance said that applying paraffin at the insides of the dome will seal the concrete and make it gas-proof. According to Mr. Robbins, this is a very easy and simple secret which should be publicized so many people can use that technology. Further, he said that the secret came from Mr. Kurt Roos.
Mr. Alloysius Capisonda of the LLDA noted the USAID support to the program being conducted by LLDA for slaughterhouses and hog farms, which unfortunately were terminated for some reason. He requested the Conference organizers to continue to support the program on mitigation of greenhouse gases (similar to that extended by the USAID), particularly from livestock and agro-industrial wastes. To date, the LLDA is targeting 225 hog farms and 175 slaughterhouses.	**Ms. Elisea Gozun** said that this can be discussed later.
Mr. Kurt Roos of M2M of the US EPA raised a question for Christian Alvarado of Phil Bio regarding compliance of projects. About six months ago, he saw some farms that were hardly in compliance with the CDM – there were neither gas meters nor flares while these were required.	**Mr. Christian Alvarado** of Phil Bio Sciences Co. Inc. said he will have their operations department checked whether what Mr. Roos claim was true. He thought that they couldn't operate without government licenses. As far as they were concerned, they were compliant.

	Mr. Kurt Roos noted that CDM projects had nothing to do with government licenses but with foreign investors buying the CERs. **Mr. Christian Alvarado** said that one of his colleagues, who will have a presentation later that day, could answer the questions raised by Mr. Roos.
Ms. Teresita Cambel of the Sultan Kudarat Polytechnic State College asked the three presenters if there were sizes for dome biogas units for say, 50 swines; what was the size of these and the cost of such unit.	**Mr. Christian Alvarado** of Phil Bio Sciences Co. Inc. said that they have minimum requirements for BOT projects - a thousand sow per farm. If it was a turnkey project, it didn't matter how many the farm will invest in the system. **Mr. David Robbins** of Sanitation of the Philippines added that it was important to know that one can still collect biogas even for very small amount of animals, like backyard hog raisers, who may have only two heads, using tanks for biogas consumed at homes. He said that from two to a thousand, there are inexpensive systems. The real key is to find the right technology. He thought that one of the goals of the Methane to Market program is to help the end users to make informed decisions. **Dr. Poon Thiengburanathum** of ERDI noted that the last projects mentioned by Mr. Robbins were interesting. In fact he had a 2 cubic meter reactor that can use waste from around 10 pigs. **Ms. Elisea Gozun** added that no matter what size or whether it was for piggery, slaughterhouse or household, something can be designed. This was shown by Mr. Prakash Lamichhane of BSP Nepal. Costs will vary depending upon the size. **Mr. Prakash Lamichhane** of BSP Nepal noted that for household consumption, 2 pigs can support the cooking needs of one family with 5 members.

	Ms. Elisea Gozun repeated the numbers – 2 pigs for a 5-member family cooking 3 times a day. She also mentioned that Gawad Kalinga communities will be installing biogas digesters for sewage and wastewater treatment for 30 households that would produce cooking requirements of 10 households.
Mr. Prudencio Calado of Land Bank requested clarification from Dr. Poon on the retention fund required for the PoA**.**	**Dr. Poon Thiengburanathum** of ERDI said that for the technology that they used for the CMUCD, the retention time is 6.5 times days. **Ms. Elisea Gozun** noted that Mr. Calado was talking about the retention fund (not retention time), as he is from the bank. **Dr. Poon Thiengburanathum** of ERDI said that they collected 10% of the revenues; these will be given back after 10 years. **Ms. Elisea Gozun** repeated that10% that will be given back at the end of the project. **Mr. Prudencio Calado** of the Land Bank asked if it was the same as the management fee that we are talking about here in the Philippines; or is it another fund that supports the PoA? **Dr. Poon Thiengburanathum** of ERDI likened the retention fund to a guarantee fund; but it is also used to manage the system. **Ms. Elisea Gozun** noted the two uses of the retention fund – for management costs and for contingencies. In addition, she asked if the 45% subsidy was provided by the national government. **Dr. Poon Thiengburanathum** of ERDI said that government subsidizes gas projects in Thailand before CDM operates. **Ms. Elisea Gozun** noted that the Thai government is subsidizing companies going into biogas digestion; after CDM, the subsidies are reduced to 18%.

	Dr. Poon Thiengburanathum said that 5 years ago the government provided subsidy to provide the farmer or private sector the technology that they needed which was around 20% for this purpose. **Ms. Elisea Gozun** clarified if the subsidy from the government went to the academe or institution (ERDI) which Dr. Poon confirmed. She noted that it is not a general subsidy to anybody, in case there's a clamor for some subsidy from the government. **Dr. Poon Thiengburanathum** elaborated that the subsidy came in two parts: the first is by way of a management fee to the institution, which was a very small portion of the subsidy; the bigger portion went to construction of facilities. He said that CDM propped up the project funding. **Ms. Elisea Gozun** said that the CDM is an addition or added bonus; the incentive is quite big financially to encourage people to go into projects. **Dr. Poon Thiengburanathum** of ERDI said that government subsidy is one mechanism to help in capacity-building. **Ms. Elisea Gozun** noted that we already have such in the renewable energy law and encouraged everyone to read the guidelines in detail because there are a lot of incentives that are provided there for those who will go into renewable energy. She then thanked all the panelists and solicited for applause.

Session V. Philippine Case Studies for Reducing Methane Emissions in the Agro-Industrial Sector

This session was chaired by **Director Davinio Catbagan** of the Bureau of Animal Industry. Honorable **Ariel Magcalas** together with **Ma. Lourdes P. San Miguel**, Mayor and MENRO of Sta. Cruz Laguna respectively talked about the Decentralized Wastewater Treatment

System of Sta. Cruz Municipal Slaughterhouse. **Mr. Prakash Lamichhane**, BSP Nepal gave a presentation on the Biogas Technology and Biogas Support Program.

Mayor Magcalas and **Engr. San Miguel** gave a detailed presentation on the planning, development, construction, and operation of their wastewater treatment system in Sta. Cruz, Laguna. They gave some operating parameters, including wastewater volume reduction, BOD level reduction and layout of unit operations. They also discussed the compost and fertilizer derived from sludge. Engr. San Miguel said the proceeds they estimated from their CDM project was a revenue stream that will be used for operation and maintenance, funding of new environmental projects and for the repayment of loans.

Mr. Prakash Lamichhane presented the biogas technology that they are employing in Nepal, together with the Biogas Support Program. He gave details of the biodigester stirring without mechanical systems and applications of biogas beyond the household – community-wide, jails, schools, and army barracks. Finally, he presented some figures to prove that biogas technology is not expensive.

Session V Open Forum:

Davinio Catbagan of BAI and session chair thanked the presenters and solicited reactions to the presentations. He also noted that many models of various sizes had been presented and assured the audience that BAI had better models in the 70's.

Question	Response
Mr. Edgar Erlano of LGU Sorsogon City has not seen any digester without a stirrer in the dome-type biogas model. He said that the sediments might affect the solids from moving if there is no stirring; the production of methane gas will also be affected.	**Mr. Prakash Lamichhane** of BSP Nepal said that the biodigester is working up and down without rotational movement; the model has been redesigned to have automatic stirring without mechanical means; the structure will automatically stir without applying external forces. **Dir. Davinio Catbagan** of BAI said that what we use here in the Philippines are manual rotators in the dome type biogas digesters. **Mr. Prakash Lamichhane** of BSP Nepal said that previously, the digester was a fixed type; now, the design has been changed with a slant inlet so there is rotational movement, not only vertical but horizontal movements.
Dir. Davinio Catbagan of BAI noted that they only see slurry in the system and asked what mechanism brought about movements.	**Mr. Prakash Lamichhane** of BSP Nepal answered that it is in the form of slurry, thus the movement. With hydraulic flow, the gas formed pushes the slurry up and down;

	further, the inlet is slanted to achieve rotational movement. **Dir. Davinio Catbagan** suggested that the pressure comes from the inlet area; otherwise it will not move. **Mr. Prakash Lamichhane** said that the slurry coming from the inlet will have rotational movement, so it is automatically rotating and there is no need for a stirrer. **Mr. Prakash Lamichhane** said that once we put in the waste, gas is formed which will push the liquid out. When the user uses the gas, it will move down and will create rotational movement.
Mr. Edgar Erlano of LGU Sorsogon mentioned that stirring is done 3 to 5 times a day; the more stirring, the better.	**Mr. Prakash Lamichhane** of BSP asked if stirring was in the inlet or the digester. If it was a mechanical system, it will be costly. He said that designs have to be simple, especially for volumes of 2 or 3 pigs or cows. Bigger digesters can be designed for mechanical stirring. **Ms. Elisea Gozun** said that it is a different design if there is a stirrer. Movement is caused by waste coming in from the inlet. As gas is generated, pressure builds up and pushes the liquid out; because of that there is movement. That was what Mr. Prakash meant us about moving the slurry without mechanical stirring. **Dir. Davinio Catbagan** of BAI pointed out that the degree of movement would be equal to the volume that is being added; if there was less volume, then, there was less movement. **Ms. Elisea Gozun** said that the model presented by Mr. Prakash is the same model that Paul showed - the one from Valenzuela. Once the effluent is fed to the digester, the gas pushes the sludge out.

	Ms. Josefina Contreras of BAI confirmed the stirring principle explained by Mr. Prakash; when the effluent is fed into the digester and when there is gas produced, it pushes the effluent from the digester out and the semblance of mixing is already there. **Dir. Davinio Catbagan** noted that the experience in Sorsogon is different as it had to be moved manually.
Mr. Miguel Zosa of LGU Tacloban asked about the design of the slaughterhouse, as they are finalizing theirs. They are debating whether or not to integrate the biogas with the wastewater treatment facility because it will be complicated in terms of investments and operating costs; you handle less of the BODs rather than combining it in just one pond.	**Ms. Maria Lourdes San Miguel**, MENRO of Sta. Cruz Laguna cited their case where the solid waste is already separated. She said that the solid waste is being separated and handled by the MRF for their composting activity. She said that separating wastewater and solids has brought down the capitalization requirement from PhP 2.8M to PhP 1.3 because of a simpler design of the DEWATS technology by BORDA. The savings have been realigned to lighting and parking systems that will help them during full blast operations.
Dr. Roberto Dante Corros, Roxas City Veterinarian said that he was tasked by their mayor to look into landfill technologies and asked how the Sta. Cruz LGU was able to get contract for building the wastewater treatment facility (WTF); whether the design and the building of the WTF were really handled by DEWATS or by the LGU itself.	**Mr. Ariel Magcalas**, the Mayor of Sta. Cruz Laguna answered that the municipal government got funding through loans for the programs of LISCOP implemented together with the LLDA. The municipal government provided counterpart funding. **Ms. Maria Lourdes San Miguel**, MENRO of Sta. Cruz, Laguna elaborated on the design of the DEWATS; how they tapped the experts due to their limited technical know-how; and how they were able to meet standards for compliance purposes. She took pride in the project, it being one of the first large-scale projects on WWT within the province of Laguna. **Mr. Prakash Lamichhane** of BSP Nepal added that the DEWATS system is very simple and easy to install and low cost; further it doesn't need a mechanical device for stirring. He went further by describing the operations – solid particles go to the digester

	first and the wastewater to the DEWATS; the effluent from the digester is also brought to the DEWATS system where the BOD and COD of the water is maintained.
Dr. Roberto Dante Corros, Roxas City Veterinarian restated his question regarding funding and implementation of projects. He made a suggestion that the DENR could provide a model of anaerobic digester that the LGUs can adopt and implement. Further, he noted Mr. Prakash's design on the stirring principle without mechanical means. Finally, he reiterated his concern on the design which will be acceptable to the DENR, including standards on BOD and COD.	**Ms. Elisea Gozun** said that there are various biogas technologies that will suit the specifications and needs of the end-user. She pointed out the facility of BAI in Valenzuela City and invited interested parties to see it, including the training center. She added that even manually-stirred cases can be bundled under the programmatic approach. She cited the biogas digesters with the Gold standard of the WWF. She described how several thousand biogas systems in Nepal are near homes to be able to use gas for cooking; these can also be fed with animal waste such as cattle manure; biodigester requiring low technology and even those with mechanical system installed.
Ms. Techi-Cruz Capellan of Ethanol Producers Association of the Philippines recalls about the DENR organizing a technical working group to discuss the biogas digesters design standards. This is important especially in the programmatic mode; this is to improve methane recovery. She said that there are currently no international standards and the TWG is a welcomed development because it will attempt to put in place certain standards that can then be subjected to international testing and accreditation. She hopes that the initiative can be fast-tracked.	**Dir. Davinio Catbagan** of BAI agreed that there should be standards even at a local level; that these should be formed by the Bureau of Product Standards or the DOST. He recalled the situation in the 70's when the BAI was a line bureau and had around 100 artificial breeding centers for pigs equipped with dome-type biogas digesters but all were gone when BAI became a staff bureau. He then asked representatives from DOST to react on the standardization of biogas in the Philippines. He also asked Mr. Reymer Martinez if these were related to the BAI standards. **Mr. Reymer Martinez** of BAI informed everyone that there is a standard for biogas in the Philippines, the PAES 2001-A. Mr. Catbagan asked who recognized that standard for BAI. **Mr. Reymer Martinez** said that is incorporated in the building code of the Philippines and it is the Philippines Agricultural Engineers Standards;

	accordingly, construction of all biogas and related structures should be signed by a licensed agricultural engineer. However, this is not well documented. **Dir. Davinio Catbagan** added that it's not only not very well documented but also not being implemented. **Mr. Roberto Guarte** of the Visayas State University said that work on biogas is being done intensively by the different state colleges and universities in the country, including promotion of the technology, surveys on existing installations, and researches on biogas production. There are 21 centers doing such research with funding from the Department of Energy.
Dir. Davinio Catbagan of BAI asked what excreta give the highest biogas energy per unit volume of waste.	**Mr. Roberto Guarte** of the Visayas State University ranked chicken, pig and cows, in that order, although we don't have many cows in the Philippines. In the Philippines, he said, we have chicken as a good source of biomass; weeds and cogon grass are incorporated and ratios are well established. Slaughterhouses, however, are difficult to maintain and standards have to be set to maximize gas production. He pointed out the DOE's programs in terms of information on technical aspects.
Mr. Jaime Dilidili of the Cavite State University asked about biodigesters in slaughterhouses as being part of the wastewater treatment; how they can only reduce pollution by 60% and still need further treatment so as to meet DENR standards; if biological filters can be installed to be able to meet standards. **Dir. Davinio Catbagan** of BAI asked Engr. San Miguel if it will be cheaper if there were two digesters.	**Engr. Maria Lourdes San Miguel**, MENRO of Sta. Cruz, Laguna, said that query can be answered by the mayor (Mr. Ariel Magcalas) whether it can be considered as another project since they are now in their budgeting period. **Dir. Davinio Catbagan** of BAI gave his views on a slaughterhouse being a revenue-generating endeavor. He cited the Sta. Cruz slaughterhouse as a Class AA, meaning meat process can be distributed in the country, which makes it very competitive in terms of revenues, as there are no other units of the same classification around the area.

	Dir. Catbagan then passed the microphone to Ms. Gozun to end the session.

Ms. Elisea Gozun asked for a round of applause for Director Dave Catbagan and the other panelists, including Mayor Magcalas, who invited everyone to their upcoming Kesong Puti Festival in Sta. Cruz Laguna from December 1 to 5. The mayor wanted everyone to try the white cheese from carabao's milk, and also to visit their slaughterhouse. Ms. Gozun thanked the mayor for sharing their experience and lauded him as a role model and hopes that more mayors and governors will follow suit – to come up with treatment systems, produce methane and somehow reduce operational costs in slaughterhouse in terms of boiling water, to justify investments.

Ms. Elisea Gozun announced a break for lunch at the Conservatory and urged everyone to come back by 1:30 pm. The session ended at 12:10 PM.

Session VI. Philippine Opportunities for Reducing Methane Emissions in the Agro-Industrial Sector.
Chair: Ms. Elisea B. Gozun

Panel Discussion: Current Experience with CDM Projects in the Philippines

For this topic the members of the panel were composed of **Mr. Jo-Rex Camba** of Phil Bio-Sciences Co., Inc., **Ms. Mila Jude** of SEEDLinks, **Ms. Mia Jarumayan** of PennWood Corporation and **Mr. Chin Kiang Mun** of TUV SUD PSB Philippines, Inc.

Mr. Jo-Rex Camba shared Phil Bio's experience in CDM project implementation and presented the company's core competencies, projects undertaken and experiences in implementing these. He also discussed capacity building and trainings that they have undertaken, including a knowledge center and an integrated CDM project management program. He presented learnings from their experiences; also their preparations for the post-2012 CDM environment.

Ms. Mila Jude presented two projects – the Bukidnon Corn Cob-Fired Driers fuel replacement project and the Isabela Post-Harvest Facility Project. The former, as the CDM project, is just part of the bigger Mindanao Grain Processing Co, Inc. Operations. The latter envisions a biomass to power CDM project.

Ms. Mia Jarumayan presented their company's capabilities. She shared their experience in the packaging of projects; how to keep abreast with new rules and guidelines and being aware of developments. She also gave pointers and cited the importance of getting a good estimate of CERs.

Mr. Chin Kiang Mun introduced their company, their world-wide operations, services offered, including CDM project development. He presented a detailed profile of projects they are currently doing, explaining details of the CDM project activity cycle.

Panel Question and Answer:

Ms. Elisea Gozun: We would like to open the floor for questions.

Question	Response
Mr. Marcelo Labre of Standard Bank asked about additionalities and how the law presents quite a challenge in terms of additionalities; how can one argue additionality if this was implemented by the law?	**Mr. Jo-Rex Camba** of Phil Bio clarified that all their projects concern pig waste except for the upgrade of Makati South, a sewage treatment plant. They don't have a registered project yet nor projects that include solid waste treatment. He said that as for additionalities, they have not yet come to that point. **Ms. Elisea Gozun** responded that RA 9003 provides an integrated and positive response to solid waste problem and requires segregation, composting and the like. However, nothing in the law requires recovery of methane, so it is not mandated by the law and that is why it is an additionality. **Mr. Joe Tuyor** of the World Bank noted that while the law is there, LGUs are not implementing the technical aspects of the law because of lack of funds. He said that is one of the justification for non-compliance with the law: financial barrier for solid waste management facilities. The other barrier is technical barrier. These barriers can be used to justify non-implementation of projects that have been mandated by law. **Ms. Mila Jude** of SEEDLinks added that if project is small or if the project is less than 15 MW, produces less than 6,000 tons CERs per year, it is considered at least one barrier. At least one barrier is enough for a small scale project. **Ms. Elisea Gozun** noted that the previous discussions are for local government representatives who were present. She

	warned them that they should not make the mistake of passing laws that require conditions that cannot be met and make projects ineligible. **Ms. Gozun** continued by pointing out that validation and verification become bottlenecks in the process; the CDM Executive Board accredits the validation and verification and projects cannot move forward if they cannot hurdle the validation. But according to her, this is also an advantage in PoAs because one goes through that process only once for the very first project; after going through the validation, one doesn't have to undergo the process again. **Mr. Chin Kiang Mun** of TUV SUD confirmed that the validation and verification steps are the bottlenecks. This is brought about by the stringent training required for CDM auditors, who are sent abroad to acquire required skills. Still, he said, auditors cannot do all the 15 scopes of validation and verification. Since they are expecting about 2.9B CERs running up to 2012 they are training more and more qualified auditors. Mr. Chin noted that another thing that is contributing to the bottleneck is the process itself: high standards and strict guidelines require time and a reasonable timeline is needed in running the projects. **Mr. Jo-Rex Camba** of Phil Bio Sciences Co. commented that for the registered projects, the flare systems have been considered early on in the evaluation of the project design. For the CDM project registered for Phil Bio, flares have been installed but there are no flares yet for unregistered projects. He said sample of flares can be seen at Phil Bio's Magallanes project. **Ms. Elisea Gozun** added some information regarding the Payatas methane reduction project. The first phase is a 200-kW power generator which is already providing lights for the perimeter of Payatas and the street

	lights; but the rest of it is flared. She said that it's only when they proceed to Phase 2 that they will produce enough power to sell to the grid.

Ms. Elisea Gozun thanked the panelists and proceeded with the next panel presentation.

Panel: Overview of Philippine Methane Reduction Programs in Livestock and Agro-Industrial Waste Sector

The panel on the Philippine methane reduction programs in livestock and agro-industrial waste sector was composed of John Morton and Joe Tuyor, Sr. Environmental Specialist World Bank Washington and Operations Officer World Bank Philippines, respectively. They talked about WB initiatives and on-going programs as regards methane reduction with emphasis on what need to be done, such as standardization of process, and methodologies that can be acceptable internationally. They identified steps to be taken so as to align with goals and targets of the bank and the post-2012 scenarios.

Question and Answer:

Panel Question and Answer:

Ms. Elisea Gozun thanked Messrs. John Morton and Joe Tuyor and proceeded to clarify that for the PoA, there is need for at least one firm project. Others could be indicative but there should be at least one very firm one before approval is sought.

Mr. Joe Tuyor of the World Bank said it depends on the situation and points out to Thailand's pig waste case where they have firmed up two projects. In the case of ethanol or distillery, where there are big volumes of ERs, one or two projects are required. With slaughterhouse, there are enough projects.

Ms. Elisea Gozun clarified that according to the CDE Executive Board guidelines, what is needed is only one firm project; the rest may be only expressions of interest.

Question	Response
Mr. Marcelo Labre of Standard Bank asked what are the other requirements for one to become a PoA consolidator.	**Mr. John Morton** of the World Bank said that it depends on whose requirement one is talking about, whether it's of the UN or the buyer. Mr. Marcelo Labre asked for the perspective of the UN. **Mr. John Morton** said that there is no known certification process but he was not sure about that. He advised to just have a PoA so that one will be listed as coordinated

	entity. Beyond that, one just has to have the legal mandate on behalf of projects owners; the legal mandate can be through MOU or MOA.
Mr. Marcelo Labre also asked what the World Bank requires in order to finance or be part of the PoA.	**Mr. John Morton** said that it is viability of the PoA. They as an institution cannot work with anyone. It's more on whether there's enough ER's and whether the project is of strategic importance to the Bank within a specific country. They look at the country level and whether there are interested buyers. He gave the example of the CPF and then participants, investors and the CPF. **Mr. Joe Tuyor** of the World Bank said that in terms of the aggregator, what are required are capacity, track record, warm bodies or enough people to develop the program; also familiarity with the environment's social safeguards. **Mr. Gerry Parco** of the World Bank cited the Chillers Project, which is also a PoA, where the DENR was tapped in the selection of the coordinating entity. The main criterion was financial management capacity to handle funds because it was crucial to the Bank that there was integrity in the flow of funds. **Ms. Elisea Gozun** shared that there is another PoA with the same situation where the managing authority or CME (Coordinating Management Entity) is a national government agency; this is the SWITCH program of the Department of Energy, with the Asian Development Bank which is also being packaged as a PoA. **Mr. Joe Tuyor** pointed out that there are certain modalities on how the managing entity can be formed. It could be an academe - based coordinating entity like the Chang Mai University's Energy Research Development Institute (ERDI); it could be a government agency like the Chillers Program of the DENR, where they are the coordinating managing entity but are

	supported by project consultants; or, it could be totally private entity acting as aggregator or CME. **Ms. Suzette Chua** of the Asia Carbon Pacific Fund of ADB said that with regards to the SWITCH program, they were actually doing the project with DOE while the EBCF is negotiating for the credits that will be produced. She said that in doing PoAs, it is really hard to get validators to validate a project because of the liability factor attached to it and the fact that it's new. Furthermore, she said the cost of getting a validator has to be taken into consideration; that has to be balanced with the amount of ERs that will be obtained from the PoA.
Mr. Marcelo Labre of Standard Bank asked if financial institutions could put their money in competing consolidators.	According to **Mr. John Morton** of the World Bank first ask if the projects are in the same boundary, meaning the same country; not the same project or projects that are overlapping. **Mr. Marcelo Labre** clarified that boundaries can be country or region; the same boundaries for the project and the same methodologies. He cited the Chillers Project, with another competing consolidator, is going to be looking for projects. He asked if that would that be approved by UN for example, and if yes, would they (financial institutions) put their money in one of the competing entities? **Mr. Joe Tuyor** of the World Bank said that that was possible but banks wouldn't want to be competing with each other. It's possible, for example in the pig waste program, where there is enormous potential in terms of emission reduction, where probably 2 or 3 or 4 PoAs can be developed. **Mr. John Morton**, World Bank said that he had seen no rules around that and hasn't gotten to the EB's desk, either. He pointed out their small hydro project in Vietnam, with one coordinating entity but which involves all

	sorts of participating banks. Have you see an element of competition where you have competing banks; that sort of model works, or is, at least, being pursued.
Mr. Roberto Dante Corros, the City Veterinarian of Roxas City wanted to know how an LGU can avail of the CERs or carbon credits, without knowledge on how to go about with the PoAs; there's a very big potential for backyard raisers for livestock; so how will the LGU avail of these activities?	**Ms. Elisea Gozun** introduced Ronald Cartagena, the environment officer of the League of Cities, and asked him to respond to the query. **Mr. Ronald Cartagena** of the League of Cities said that for the cities, they try to gather data so they can have a baseline info; then they inform all of the cities that they have the intention to bundle projects and hope that everyone responds; also, that participation in funding facilities is available because there are a lot of opportunities in this field. Linkages are established between the city executives regarding bundling and packaging of projects. **Ms. Elisea Gozun** made a comment specifically for cities, as she serves as consultant to the World Bank Institute for the Carbon Finance Capacity Building Program for emerging megacities in the South. She points to the Quezon City experience, and how they have been engaging cities for slaughterhouse and public market projects; how they have been organizing workshops on biodigesters and CDM technologies and opportunities. Soon they will be looking at the programmatic PoAs for slaughterhouses and public markets. Work is being done on the Clean Technology Fund of the World Bank, to fund transformative projects in the energy and transport sectors. She also mentioned DBP's effort in Regional Infrastructure for Growth Project, which will include funding for local governments for transformative projects such as energy efficiency. **Ms. Noemi dela Paz** of the Land Bank of the Philippines mentioned the existing agreement or tie-up with the World Bank, for municipal waste management projects;

	where they are helping several LGUs craft PoAs for sanitary landfills and other endeavours.
Dr. Teresita L. Cambel of the Sultan Kudarat Polytechnic State College asked how research institutions or state colleges and universities can avail of the program or support for CDM programs. She pointed out that state colleges and universities also have resources which can be of help to the program. She asked how facilities can be availed of; where to submit applications.	**Mr. Joe Tuyor** of the World Bank gave ways in which the academe can be involved in the CDM process, or even in the post-Kyoto instruments. One is as technology providers; another is for them to be the aggregator or managing entity, similar to the ERDI of the Chiang Mai University; another role is in capacity building, in technology and program development. He noted that the university should be familiar with the current set-up and should look beyond 2012 with programs, PoAs. He cited Land Bank's efforts on pig waste and landfills and the possibility that academe can be involved by way of cooperation and collaboration. **Ms. Elisea Gozun** requested for a list of these academic institutions and what specific areas they have been working on so that they can also be part of the database. **Mr. John Morton** commented that there is a huge resource in the academe sector even if he admitted that they are not that good at working with the academe; but he said it's a finding the opportunities of working with, and engaging them financially is a way forward. He emphasized that these opportunities may not always be obvious but can be the best way forward.

Ms. Elisea Gozun asked for a big round of applause for Messrs. John Morton and Joe Tuyor and thanked them for their presentations. She then called on Mr. Kurt Roos, the Team Leader of the Agricultural Methane Program of USEPA to talk about the role of Methane to Market Partnership Program.

Role of the Methane to Markets Partnership Program Lecture

Mr. Kurt Roos, M2M USEPA introduced M2M program's objectives and endeavors and how it fits in the Philippines and its partnership with World Bank, with the main goal of significantly reducing GHGs, specifically methane. He enumerated the areas M2M is working upon: mining, coal mines, agro-industrial wastes. He emphasized the importance of how to properly manage a project and the need to implement developmental steps such as

building and creating market demands, transfer information, develop capacity and technical expertise and even policies. He said that resource risk assessment should also be given emphasis to identify potential methane emission reduction, to prioritize sectors, and to form implementation plans for a country.

Furthermore, **Mr. Roos** stressed the need for transferring technology and training to the local people and to further broaden dissemination of information in conferences. He discussed about their POA projects and other demonstration sites in other countries like Mexico and emphasized the slogan "success breeds success endeavors".

Mr. Roos observed that in the Philippines, there are a number of commercial digesters and all have varying levels of performances. He stressed the importance of developing a national technical standard, a certification program for equipment providers, and measurement and evaluation protocols that can be internationally accepted.

Ms. Elisea Gozun thanked **Mr. Kurt Roos.** Although there was no provision for Q&A, she asked for comments, if any. Having none, Ms. Gozun reminded everyone that Kurt will just be around for any questions and noted that the next session will be important because the way forward for CDM will be discussed.

Ms. Elisea Gozun observed that some participants seemed to be" first-timers" about CDM and related matters. She enlightened them by defining terms, explaining acronyms, outlining process and identifying key players. She gave a little bit of history about Kyoto protocol; how it came about; the need to reduce GhG emissions by Annex 1 countries; and the role of Annex 2 countries. Terminologies involving CDM, ERs, carbon credits and the like were also explained. She outlined the certification process and the different entities involved such as the certifiers, validators and the executive board.

Ms. Elisea Gozun presented **Mr. Gerry Parco** of the World Bank to present and discuss the list of potential projects and the next steps for CDM in the Philippines.

Mr. Gerry Parco of World Bank made a summary of what had been discussed for the past 2-days. He made a presentation of the potential PoAs that were identified during the conference and outlined the roles of the LGUs and financial institutions. He also emphasized that the main objective of the conference was to introduce new rules and procedures on programmatic CDM. He talked about the different Post-Kyoto scenarios. He encouraged interested groups to join the program in later years and not necessarily on the first year of implementation. He emphasized the role of early adopters since the concept of programmatic CDM is new. He also discussed possible PoAs that they are working on such as alcohol distilleries, desiccated coconut and other groups which are high BOD generators. Mr. Parco said that anyone can participate as long they have good financial management capability and technical know-how. While in principle it can be anyone, there also has to be a selection process so the proper will not fail. He stressed that the Philippine government is actively involved in PoA and there are developers and assessors that can help potential parties. PoA is a new development, is something new and an innovation. He stressed the importance of early adopters - those who can manage change while change is happening everywhere. The key to change is identification of early adopters. Early adopters are the first ones to benefit for this change to come. So we will try to support these early adopters. We will provide necessary support in terms of our technical assistance; in

terms of other support necessary to achieve the roll out of this PoA for methane capture; together, of course, with the M2M program. Mr. Parco thanked DOST, M2M and all the conference organizers before handing the closing of the Conference to Ms. Gozun.

Ms. Elisea Gozun reiterated the importance of playing an active role in combating climate change because its effects are already being experienced especially in the Philippines. For instance, the impacts of typhoons will lead to changes on structural standards being set in the Philippines. The adaptation measures that should be installed must be carefully studied. She emphasized that what we have now is the result of what we have been doing to our environment. The greatest challenge now is how to reduce the adverse effects of human activities to the environment. She ended with a statement that our very survival is at stake. It is in our hands whether we go forward or fail.

Day 2 session ended at 5:00 PM.

End of Conference