SUSANE - Sustainable, sanitary and efficient management of animal manure for plant nutrition

Network building
Workshop for development of a network of
Environmental friendly and sustainable livestock production in Vietnam

By Anya B. Vinstrup and Sven G. Sommer

In October 2007 livestock manure experts gathered in Hanoi to exchange information about research focusing on developing technology for environmentally friendly management of animal manure in Vietnam.

The gathering was a response to the recommendation of the January 2007 Workshop about "Sustainable, sanitarian and efficient management of animal manure in Vietnam", where it was identified that livestock production is changing rapidly, and that this transition is not followed up by appropriate technologies and management of the large amounts of animal manure produced. Further, the participants agreed that there is a need of a Vietnamese forum for exchange of knowledge in this particular field. The Forum could also be a site for creating contact to support collaboration when carrying out farm research and giving advises for an environmentally friendly and sustainable management of animal manure.

The SUSANE research project, therefore, organised this workshop with invited researchers and institutes. At the workshop five projects was presented and new contacts and collaborative opportunities were established. The content of the presentations will be referred below, including a short presentation of the new Danida initiative and a summing up of the conclusions drawn after the discussion.

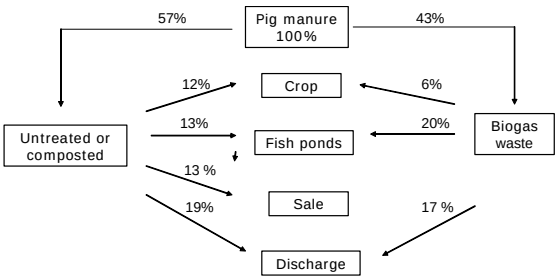
Presentations

SUSANE research project

PhD students: Vu Thi Khanh Van, National Institute Animal Husbandry; Tran Minh Tien, National Institute of Soil and Fertilizers; Dang Thi Thanh Son, National Institute of Veterinary Research.

The baseline study of the project was presented (In press in *Journal of Livestock Sciences*). The frame of the project is a whole system approach with the objective to increase the fertilizer value of manure, reduce the health risks associated with manure handling and reduce the environmental pollution. This covers three activities: 1) Management of Manure, feed-excretion, collection and storage of manure (Ms. Van, NIAH), 2) Optimizing timing and precision of manure application for efficient plant nutrient utilization (Mr. Tien, NISF) and 3) Reduce of transmission of pathogen (Ms. Son, NIVR).

The achievements during the first year of activities have been an adaptation of a Danish feed excretion model to Vietnamese conditions, a study including a feed and excretion experiment (Activity 1). A study on the effect of the application rates and assessment of fertilizer equivalent value of manure applied to a maize-rice-rice crop production, included is a study of the effect of pre treatment of solid manure i.e. composting (Activity 2). The third activity included a study of survival of faecal indicators and pathogens as affected by composting.



The next two years of studies in activity one will include experiments for determining plant nutrients and carbon loss during storage of solid manure, a detailed study of ammonia emission during storage and development of a whole system model of farm nutrients. In activity two, experiments will be carried out to determine; a) the optimal application methods and timing to selected vegetables and b) the effect of using fresh manure on nitrate content in vegetable. In activity three the studies will focus on a) survival of faecal indicators, bacterial pathogens and parasites in integrated pig-fish pond systems, b) development of bacterial antimicrobial resistance in integrated pig-fish pond systems, c) Microbiological food safety of fish raised in integrated pig-fish pond systems and d) in collaboration with activity two this activity will examine the effect of using fresh manure on pathogen content in vegetable.

Nature conservation watershed project (MSEC project from IWMI-IRD joint-venture)

Dr. Didier Orange, IRD-IWMI, posted at SFI

The project has a focus on natural resource management and erosion in the mountain regions of Thailand, Laos and Vietnam. In Vietnam the benchmark study is a watershed in Tien Xuan Commune (Hoa Binh Province) 60 km from Hanoi westwards. The project is carried out in collaboration with Dr. Tran Duc Toan from SFI. The benchmark study includes water cycle, hydrology, soil losses, and relation between soil biological activity, erosion and river water quality.

There is concern about soil erosion due to the roaming cattle. Therefore, a research study on PES concept (Payment Environmental Services, based on the ecosystemic approach of watershed) assumed the research hypothesis such as: downstream farmers will agree to support hill farmers by mutual contract with partial funding for supporting construction of biogas digesters on the farms uphill. The farmers uphill have to construct animal houses and composting (Vermicompost) sites, if they wish to get support for a biogas digester i.e. housing is needed to get the manure to feed the biogas digester. The roaming of cattle is stopped, because the animals are housed and in consequence soil erosion has been reduced. The benefit for downstream farmers is that soil does not sediment in their ponds for irrigation and rice production. For the uphill farmers energy is produced, manure is provided for crop production and the soil is not deteriorated due to erosion.

The programme will end in 2008 and there is a great interest to continue the work in a new project integrating all or part of the activities in this project. Further, there is a need of knowledge about manure fertilizer value based on research about Nitrogen and Carbon cycles (output calculation

from uphill to the lowland) and to some extend also for participating approach on constructing and using digesters and vermicompost units.

Livestock Waste Management project, WB, GEF, FAO

Dr. Bui Van Chinh, MARD

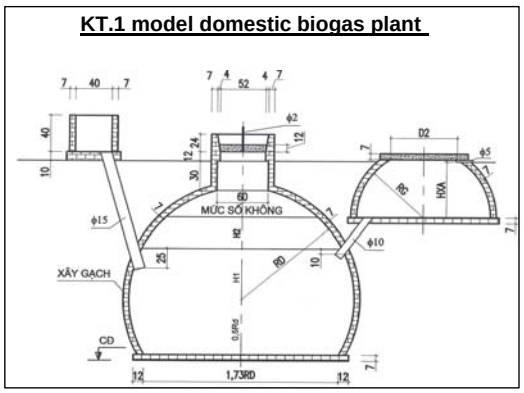
This project is located in China, Vietnam and Thailand and focus on demonstrating livestock waste management techniques. In Vietnam MARD (Agricultural Development), MONRE (Natural Resources), and MOH is involved in the project, which will demonstrate new biogas production technologies.

The project partner have identified that the traditional cylinder biogas digesters often will have a too short retention time due to increasing size of the livestock production. Therefore, new designs have been developed, where ponds are covered with PVC that retains the biogas produced through fermentation of the slurry added to the pond.

We were welcome to visit the demonstration plant. The visit could be before or after participation at AAAPs conference in September 2008 (22nd Sept.- 26th Sept. 2008).

Biogas/Renewable Energy

Bastiaan Teune, SNV Advisor Biogas/Renewable Energy



SNV, The Netherlands Development Organisation, provides advisory services to a nation wide program on constructing small scale easy to operate biogas plants (Diameter 2 m and height 2 m) at small scale livestock farms. The advantages are threefold, social (jobs created), environmental benefits (easy cooking, clean air, better toilet facilities etc.) and economy (Reduced energy expenses, higher fertilizer efficiency of slurry etc.).

The project is much focused at national sector development and dissemination and at the same time is supporting the poor farmers – poverty alleviation. The farmers are supported by the government to establish the digesters. The investment is about 300 USD but after one or two year the investments has paid itself back. Pay back time is significantly increased when the "bioslurry" is used as fertilizer, which increases the yield up to 20 %.

Aside the project there is an initiative to capitalize the green house gas (GHG) reduction through CDM (Clean Development Mechanisms). The intention of the CDM project is to sell the reduced GHG emission equivalents at the international marked and channel the money back to the farmers.

The programme is run by MARD (Mr. Thanh Son, Director). With its experience in other counties SNV helps providing funds, and organisational set ups that will last after the project will stop. Currently the programme have facilitated the construction of 27,000 domestic biogas plants, in 2010 there will be built 140,000.

AAAP conference 2008

Vice Director Dr. Vu Chi Cuong, National Institute Animal Husbandry

Dr. Cuong presented the draft for the 13th Animal Science Congress of the Asian-Australasian Association of Animal Production Science on the 22nd - 26th of Sept. 08. Deadline for abstract is 1st of April 2008 (220 words). More information is given on www.aaap2008.org.vn.

The participants at this workshop have the opportunity to submit abstracts to the session "animal environment and animal waste management". Deadline for submitting abstracts are April 1st 2008. Further, proposals for additional key note presentation and speakers will be looked at positively.

Dr. Cuong also mentioned that he is collaborating with a French group setting up biogas digester in the mountainous regions. The French group has developed digesters that are functioning well in cold climates.

Danida Initiative entitled Agricultural and Rural Development SPS

Counsellor of development Cathrine Dolleris, Embassy of Denmark, Hanoi

A new ARD SPS programme (Agriculture Rural Development, Sector Programme Support) is being developed by the Danida. The programme focuses on five poor provinces and uplands/ethnic minorities and aim at supporting integrated rural development more than agriculture. In this programme Danida collaborate with DARDs (District ARD) in the provinces to get closer to the target group. Danida will not collaborate directly with departments in MARD, except for policy and research for upland livelihoods. In this new context, animal manure management is of interest as a mean to increase soil fertility with low input and to close the nutrient cycle of small scale/subsistence farming. The programme will also have a focus on indigenous ways of managing resources. Further, it is considered most important that achievements are communicated efficiently to ethnic minorities.

Important issues raised during the discussions

The workshop clearly showed that each participant have their activities within the focus area of livestock production, manure management and sanitary efficient use of the manure to "fertilize" crops and fish ponds.



Two projects have the objective to contribute support to poor livestock farmers (D. Orange and Bastiaan) and the livestock waste management (WB, FAO, MARD) has a focus on larger farmers and farmers in transition increasing their production. Their main tool for supporting farmers is

involving the biogas digester technology. Use of this technology alleviate environmental hazards related to manure management i.e. reduce soil erosion caused by roaming livestock, odour reduction, reduce spreading of pathogens, and at the same time it is beneficial due to produce of energy, increased fertilizer value of manure, provision of work etc. Fulfilling the benefits could be enhanced by the competence achieved in the SUSANE project, which focus on developing new locally adapted models for assessing manure quality and manure management technologies, it provide tools for assessing the right use of the manure in field and for assessing risk of pathogen transfer.

Problems not solved in the projects reported here is transport of slurry. Further, it seems there is a great need to test the beneficial effects of the digester technologies. It was the feeling that other new locally adapted technologies need to be introduced and tested, as there is a large focus on biogas and composting technologies.

The participants was drawing attention to the fact that projects should not only provide solutions to small scale farmers, but also include the larger as there is a development towards bigger farms. Further, the workforce in the rural areas will decline due to migration of workers to the industry and to construction sites in cities. Agriculture therefore has to adapt technologies that are less labour intensive than the present.

A model or a framework for generating funding through the clean development mechanisms (IPCC) could be most interesting.

A new project spotted during the meeting was examination of the hygienic risk related to biogas plants fermenting a mix of manure and human excretion. Will the fermentation and storage time in the biogas digester also reduce pathogens during winter time? Further, it was mentioned that due to low temperatures during winter little biogas is produced when the need of energy is high, therefore, a need for developing simple digesters working efficiently during winter was pointed out. There is also a need of knowing the composition of the manure to assess energy content and plant nutrient composition and a large need of studying fertilizer value of animal manure.

The projects presented indicate that the attendants at the meeting have much knowledge that need to be disseminated. The impression of the meeting is that the participants also have the competence to contribute to the development of text books and training/exercise materials that could be used by the extension service training or advising farmers in a sustainable management of animal manure. Beyond doubt an initiative like this is supported by the National Agricultural Extension Centre (Ministry of Agriculture and Rural Development), as indicated at the January Workshop.

The group of persons present at the meeting represents complementary groups and focus areas that could create good project collaborations. It could be an option for SUSANE to mediate some of these contacts and ideas through meetings and newsletters