

Mid-Term Review of the Asia Biogas Programme

Final Report

November 2008



This page was intentionally left blank

Executive Summary

This report is the result of the MTR¹ with the main objective to assess the progress of the ABP and to provide recommendations for the implementation of the Programme for the remaining period.

It is difficult to summarise all findings and recommendations that are given for each country. For this reason the Team Leader has chosen not to do it and to refer to the respective country reports. Many lessons have been learned by each programme, nevertheless, there is value added and interesting information surfaces when comparing the approaches and organisation of the different programmes. That is what will be tried in this Executive Summary.

Targets

In general when comparing all countries, one sees that the original targets are not being met. This is mainly due to the late reception of the final grant document from DGIS/DMW (April 2006), to the lack of reliable data about the biogas market when the ABP was designed and to optimistic projections, based on the experience of market development in other countries.

However, there are significant differences in the reasons for these delays:

In Bangladesh, there were two major natural calamities (floods and cyclones) that disturbed biogas digester construction, the POs were less motivated due to less profit, and there had been staff retention problems with the programme implementation unit and with POs. At the initial stage, the programme suffered for regulatory hindrances, i.e. registration of SNV in Bangladesh as international NGO. Thereafter, the programme also suffered for its inherent “piloting approach”, and had problems mobilising required financial and human resources. But, biogas was not new in Bangladesh, lessons learnt from the two previous, but unsuccessful programmes could have contributed to a swifter start of the programme. Also, IDCOL being the local counterpart did not have any prior experience and expertise with a biogas programme, and key programme staffs recruited at the initial stage did not have any experience in the biogas sector.

In Cambodia, biogas was almost completely new, and like in other programmes farmers needed a lot of effort and persuasion at the beginning of the programme to get convinced. Also the programme took a very careful path of developing well all needed instruments to have a working biogas programme that delivers quality. Now, demand is picking up very quickly and the potential is large.

In Laos, the main reason is that the biogas programme was indeed completely new in the country, and every step in the development of the sector had to be taken. Another reason is that due to the still large availability of wood, that it is more difficult to justify the investment in a biogas digester. It is still to be seen if this programme develops into a large scale implementation programme.

¹ Acronyms are introduced in the main text.

In Vietnam, the main problem was the uncertainty about the financing of the biogas programme, which seriously hampered its implementation, but now the GoV has assumed a leading role and is financing the programme to a large extent. Also a big bottleneck was that the provinces were not allowed to start construction before their contribution to the programme was transferred to the BPD, and the provinces only effectively begun construction at the end of May and the beginning of the rainy season. This problem has also been solved and demand is picking up strongly.

Institutional

A comparison of the different institutional models is also useful, keeping in mind the specific country situation, especially in relation to the ultimate goal of the ABP to have a market-oriented biogas sector.

In Bangladesh, the programme with the least involvement (and little government ownership), is also the programme which is closer to achieve the aim of a private sector dominated market. The GoB involvement is minimal, and only through a state enterprise is the programme governed. However, the Bangladesh biogas programme suffers from significant institutional problems with tensions between a number of implementing parties.

In Cambodia, even though the programme is fully supported, owned and implemented by the GoC, the country is also taking serious steps (with the full agreement of the GoC) towards taking away functions from the government institutions involved and to give them to the private sector. In one province for example the implementation of the biogas programme was given to a NGO, and this is likely to happen with the implementation in another province. Also important steps are being taken to have masons organised into companies and taking away any involvement of the Provincial DoA in construction². This programme is also the most harmonious in its implementation without any conflicts between the GoC institutions and the programme implementation unit.

In Laos, the set-up is also the same as in Cambodia, but its cohesion is much weaker. The programme is also at an earlier stage of development, and any private sector involvement is still a long-term prospect. However, one potential problem is the fact that the biogas programme staff finds it difficult to impose sanctions on Provincial and District ministerial staff that are not complying and not doing their work effectively. This situation can eventually lead to serious problems with quality of the digesters if not solved. There are no institutional conflicts, but this may be for the moment, because the programme is small and everyone knows and is too much involved with everyone else, to be tough.

In Vietnam, the GoV has the largest ownership of all programmes, the programme implementation unit is even a Division of the MARD and the GoV is also contributing financially the most of any biogas country programmes. But, Vietnam is also the

² The DoA are involved in construction not by building or servicing the biodigesters, but by selling materials and appliances to the masons, selecting them for construction, etc.

furthest away from any market-orientation and this may prove even impossible to achieve due to the political framework. The provincial divisions of the biogas programme are trying even to get more functions to the ministerial staff involved, instead of less. Also the programme is being affected by disagreements at the level of the programme implementation unit both between staff (problems solved for the time being) and of the staff with the Programme Director.

Subsidy

A comparison of subsidy level is also useful, even though one can not make a judgement on the effective value of the level of subsidy, because the country situation related to the biogas sector is very diverse. Another parameter which is important in this comparison is the FIRR (only for fuel benefits, without loan).

Table 1 - Comparisons between subsidy levels and FIRRs.

	Subsidy (%)	FIRR (%)
Bangladesh (1)	26.5	58
Cambodia (2)	30.1	47
Laos (3)	39.4	28
Vietnam (4)	14.3	45

- (1) For a 2 m³ biodigester (Bangladesh volume is of gas production per day, not digester volume).
- (2) For the weighted average of all biodigesters constructed. For the smallest size it would even be higher.
- (3) For the smallest size.
- (4) For the weighted average of all biodigesters constructed. For the smallest size it would be higher.

In Bangladesh, due to the strong inflation and the decreasing lack of motivation of users to invest in a biogas digester the MTR Team has recommended to increase subsidy to BDT 9,000, a 28.6% increase, even though the FIRR is very high. This new subsidy related to the cost³ of the 2 m³ gas production biogas digester, represents 32.8% of the total cost. It should be noted that the most common size built in the past was 2.4 m³ and in 2008 the average size is slightly increasing to 2.7 m³.

The subsidy **in Cambodia** dropped around May 2008, to only 15.7% on average for all sizes, a value that is insufficient to motivate people in a programme that is just in its third implementation year. However, the Executive Committee of the programme decided to increase the subsidy by 50% a very drastic increase, and the subsidy is now 30.1% of the total average biodigester costs, and results in a very high FIRR. Furthermore the above percentage for the smallest size, that of 4 m³, becomes with the new subsidy 34.9%. While the drop to 15.7% was dramatic, the level of subsidy is very high now, and should not be changed until the end of the programme period, unless there is a sustained and strong increase in construction costs.

³ The cost would increase by BDT 1,000 because the MTR Team recommended that the service charge would be increased by that amount to cater for the needs of the POs.

In Laos the subsidy for the smallest and most popular digester size of 4 m³ is 39.4% of the total biogas digester cost. This level of support seems appropriate for a country where the technology is completely unknown, and this idea is reinforced by the financial analysis which gives a FIRR of 28% with subsidy, but drops dramatically to 8% without subsidy, which is lower than the opportunity cost of capital in Laos.

Vietnam has the lowest subsidy percentage of all programmes. However, there is no justification for increasing the subsidy in a programme that has the benefit of many years of implementation, where the technology is well known⁴ and established and where there is no lack of demand. The FIRR is also very good.

Programme costs

Another interesting comparison is that of programme costs, normalised per biogas digester built. This like in the case of subsidies should not be taken literally because of the different development stages of the programmes. Also for each country the ABP costs are given for the whole programme period, while the real costs are only for 2008, with the inherently start up difficulties of the programmes with lower construction achievements. In the table below the real programme costs and those planned in the ABP programme document are given.

Table 2 - Comparisons of programme costs (in €/biogas digester).

	Real (1)	As per ABP
Bangladesh	287	150
Cambodia	346	177
Laos	475	175
Vietnam	100	100

(1) Values for 2008, from Annual Plans and Budgets 2008.

Note: these are estimated costs due to varying exchange rates.

It is remarkable that in Vietnam the real programme costs are the same as in the ABP proposal. All other countries have significantly higher programme costs.

Costs of construction

It is also interesting to compare the costs of construction of the biogas digesters in each country. The costs of the 8 m³ digester volume will be used (2.4 m³ gas production volume in Bangladesh).

⁴ On the other hand the technology may be well known to the programme and in the country in general, but this is not necessarily the case for every new customer in new areas (provinces) who is facing a serious investment decision.

Table 3 - Construction costs for 8 m3 digester volume (in €).

	Construction cost
Bangladesh	324
Cambodia	376
Laos	337
Vietnam	280

As expected, Vietnam has the lowest construction cost. The cost of the Bangladesh biogas digester is only slight less than the cost of the Laos one, due mainly to higher labour costs. Cambodia has the highest cost of all due to high costs of labour and materials.

Exchange of information

All programmes are learning from experience and are developing indigenous strategies to address the several problems faced by the biogas sector in the respective countries. Nevertheless, and despite all exchange of information⁵, structurally during workshops and study tours, and unstructured via the country biogas Internet sites, programmes are spending precious resources developing basically the same information.

One of the aspects is the material used for promotion. For example Bangladesh has developed excellent films for TV that could be adapted and used to make country media in local language and cultural setting. Another example is the development and knowledge about bio-slurry, the drying of it, and the avenues for normalising and standardising it, that is available in Bangladesh.

Cambodia for example has an excellent database for monitoring of the achievements of the biogas programme, which could be easily adapted by other programmes. Cambodia is also developing private sector development strategies that could be shared with other programmes.

Approaches to tackle the problem of biogas digesters construction stop during monsoon could also be shared among countries, with Cambodia with the best interventions in this matter.

Vietnam, builds the cheapest digesters of all programmes. That is certainly due to the low costs of materials and to the highly skilled and fast masons, but also because the programme is more flexible in the materials used in construction like pipes, taps, fittings and appliances, and this could be adopted in other countries, with given consideration for quality guarantees.

⁵ There has been already some of the exchange of information between programmes. For example, NBP has developed training and promotion films similar to the Bangladesh films using the expertise of the SNV/ABP. NBP is also using the expertise of the SNV Bangladesh bio-slurry advisor to improve the slurry extension programme. Cambodia and Vietnam programmes are cooperating to improve on the technical training for masons and supervisors. For the development of the VER purchase agreement with HIVOS, the experiences in Nepal and Vietnam as well as the involvement of the SNV CDM regional advisor have been crucial. Cambodia and Lao programmes work together on the improvement of the biogas stove and the development of training packages for small appliances producers.

Table of Contents

Executive Summary	1
Chapter I - Introduction	9
1.1 Background	9
1.2 Cross-country issues.....	9
1.3 MTR Team, Methodology and Justifications.....	12
References (Generic)	15
Chapter II - National Domestic Biogas and Manure Programme Bangladesh	19
2.1 Introduction	19
2.2 Findings	20
2.2.1 Modest GoB ownership	20
2.2.2 Target achievement	22
2.2.3 Awareness and Promotion	24
2.2.4 Subsidy and Loans	25
2.2.5 Institutional issues and implementation model.....	28
2.2.6 Capacity Development Services	32
2.2.7 Quality Control issues	33
2.2.8 Slurry Management.....	33
2.2.9 Market Orientation and Sustainability	34
2.2.10 Final Remarks.....	35
2.3 Recommendations	36
References	41
List of Persons Met	42
Chapter III - National Biodigester Programme Cambodia	45
3.1 Introduction	45
3.2 Findings	45
3.2.1 Achievements	45
3.2.2 Targets and Users' satisfaction.....	47
3.2.3 Subsidy and Loans	49
3.2.4 Institutional set-up	51
3.2.5 Training	54
3.2.6 Market Oriented Sustainability of the Biogas Programme.....	55
3.2.7 Final remarks	58
3.3 Recommendations	58
References	62
List of Persons Met	63
Chapter IV - Biogas Pilot Project Lao PDR	67
4.1 Introduction	67
4.2 Findings	67
4.2.1 Project achievements.....	67
4.2.2 Awareness and Promotion	69
4.2.3 Subsidy and Loans	71
4.2.4 Implementation model	75
4.2.5 Training issues	76
4.2.6 Slurry Extension organisation.....	77
4.2.7 Organise Masons into small businesses	78
4.2.8 Quality Control	80

4.2.9	Final remarks	81
4.3	Recommendations	81
	References	86
	List of Persons Met	87
Chapter V – Biogas Programme for the Animal Husbandry Sector Vietnam		91
5.1	Introduction	91
5.2	Findings	92
5.2.1	Achievements	92
5.2.2	Target and jump-starting of provinces	93
5.2.3	Financial problems	96
5.2.4	Level of Subsidy	97
5.2.5	ADB Loan	100
5.2.6	Provision of Credit	101
5.2.7	Institutional issues	102
5.2.8	Supporting services	105
5.2.9	CDM	106
5.2.10	Other issues	107
5.3	Recommendations	108
	References	113
	List of Persons Met	114
Chapter VI – Partnerships and Networking		117
6.1	Introduction	117
6.2	Findings	117
6.3	Conclusions	122
Annex I - ToR for a Mid-Term Review of the Asia Biogas Programme		123
Annex II – Summary of answers on Networking		131

Acronyms and Abbreviations (Generic)

ABP	Asia Biogas Programme
ADB	Asian Development Bank
CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
DGIS	Netherlands Directorate General for International Cooperation
DMW	Environment and Water Department of DGIS
EIRR	Economic Internal Rate of Return
FAO	Food and Agricultural Organisation of the United Nation
€/Euro	Unified European currency
FIRR	Financial Internal Rate of Return
FMO	Financierings-Maatschappij voor Ontwikkelings Landen N.V.
GHG	Greenhouse Gasses
GIS	Geographic Information System
GPS	Global Positioning System
HH	Household
KfW	Kreditanstalt fur Wiederaufbau
LPG	Liquefied Petroleum Gas
MFI	Micro-Financing Institution
MoU	Memorandum of Understanding
MTR	Mid-Term Review
ODA	Overseas Development Assistance
PV	Photovoltaic
QC	Quality Control
R&D	Research and Development
SNV	Netherlands Development Organisation
TA	Technical Assistance
ToR	Terms of Reference
UNDP	United Nation Development Programme
UNICEF	United Nation Children's Programme
US\$	United States Dollar
VER	Verifiable Emissions Reduction
WB	World Bank

Chapter I – Introduction

1.1 Background

In November 2004, the Netherlands Development Organisation (SNV) submitted a draft proposal under the name Asia Biogas Programme (ABP) to the Environment and Water Department of the Netherlands Ministry of Foreign Affairs (DGIS/DMW) [1]. This proposal aims to provide access to household biogas for 1.3 million people over the period 2005 up to 2011. On request of DGIS/DMW, SNV submitted in April 2005 an Addendum to the ABP proposal [2]. The Grant Document for a period of two years (2005 and 2006) was issued by DGIS/DMW in May 2005 [3]. In April 2006, the Grant Document for the full programme period up to 2012 was issued by DGIS/DMW [4], allocating a total amount of € 12.93 million as a contribution to the ABP.

The overall objective of the ABP is to further develop the market for biogas as an indigenous, sustainable energy source in selected countries in Asia. More specifically, the ABP aims to expand the biogas sector in Vietnam through support to the implementation of Phase II; to support launching and implementation of biogas programmes in Cambodia, Bangladesh and Lao PDR, and; to establish strategic partnerships with relevant institutes in China and India and to create a regional network of partners in biogas.

The incorporation of the different country programmes into one regional programme was pursued to enhance learning, effectively develop knowledge and make deployment of technical assistance (TA) more efficient. In addition, it was thought that the regional approach would also have a positive impact on the willingness of crucial partners like governments and credit institutions to participate in the respective country programmes.

Being now halfway through the implementation period of the ABP, and faced with several problems and issues in all participating countries, SNV commissioned a Mid-Term Review (MTR), to be implemented by an independent international consultant, assisted in each country by a local expert. The main objective of the MTR is to assess the progress of the ABP and to provide recommendations for the implementation of the Programme for the remaining period. The present report is the result of this evaluation.

1.2 Cross-country issues

There are a number of issues that are common to all countries, such as terminology, market orientation, biogas being (not) a productive investment, etc. In order not to repeat the same explanations every time, a general analysis of these issues will be made here.

Developing a commercial, market oriented biogas sector

One overarching objective of all biogas programmes of the ABP is to develop a commercial, market-oriented, biogas sector. The progress towards the achievement of this objective varies from country to country, but in general the ABP is still far from achieving this goal. One should clearly define the parameters that define this market-orientation.

The biogas programmes are being implemented through government organisations, except in Bangladesh (implemented through a government owned company), involving to several degrees, distributing materials, regulating and managing masons, quality control, etc. This is acceptable at the beginning of the programmes, but this is obviously not the role of governments to be involved in construction⁶, and also entails a conflict of interests, like being involved in construction and controlling the quality of it. The role of the line ministries of the biogas programmes should be limited to policy, regulation and enforcement, in order to protect people in a highly obscure market. The biogas market is not transparent, because farmers are not fully informed about the technology and they can not assess quality easily, unlike for example commercial markets like those of television sets and mobile phones, where brand names are accepted as conveyors of quality. Another difference is that one buys a biogas installation for life, unlike a mobile phone or television.

This means that even in a market-oriented biogas sector where construction is fully in hands of the private sector, and the choice of masons is not dictated by government agencies but is a function of market forces like recognised quality of construction and the ability to compete by lowering prices, that the biogas sector will always be a strongly government regulated market.

Another aspect is that the necessary enforcement of quality standards is basically a non-commercial activity that can not be left to market forces alone, even though the ones who benefit from it are the users. Maybe that in a more developed and larger market will quality control play a lesser role, because people begin to get aware of the technology, and one bad installation will not destroy the trust in the technology, but only of the mason or company that built that particular biogas digester. But, this does not mean that the bulk of quality control can not be given to a (provincial) private auditing company, which has biogas quality control as its main business. Unlike what is believed, this option does not need to be more expensive than the actual quality control by government officers, because these companies can work more efficiently and with lower costs, by planning ahead their visits. Obviously that this option only works well if there is a sufficiently large market to dilute costs, and to aggregate quality control visits. These companies would of course be subject to random quality checks by the (government) organisation charged to monitor the progress of the biogas market.

Also, slurry extension, while basically benefiting the user, is basically a non-commercial activity. Due to its nature a more specialised intervention is needed, and this is best carried by extension workers of the departments of the Ministries of Agriculture. Either

⁶ The government organisations are not physically involved in building or servicing the biogas digesters, but in selling materials and appliances to the masons, selecting them for construction, etc.

the costs of this activity are made integral part of the Ministries' budget, due to the large benefits to the economy, environment and people, or external financial support will be always needed.

Income generating or not?

In all countries active in the biogas programme, one considers the biogas investment as a non-productive or consumer activity. This situation however does not capture the true picture of the biogas digester investment and some effort should be put by the programmes to straighten this perception. For this there are three indirect arguments:

- The savings that can be gained by the users in terms of money not spent in buying fuels for cooking and lighting can be put to productive use.
- The substantial time savings due to the introduction of biogas can be (and is often) used for productive activities.
- The reduced use of expensive chemical fertiliser increases the net income of the farmers and hence, increases their ability to pay loans back or to invest in productive activities.

And a direct argument: the use of bio-slurry does increase agricultural production substantially (while at the same time reduces the chemical fertiliser use), an income generating activity.

Construction during monsoon

A common problem for all countries involved in the ABP is that construction virtually stops during the monsoon time, which can be as long as four months. This is naturally a big impediment for the achievement of the targets, but also poses serious problems like retaining the trained masons with the biogas programme, because during this time they do not have an income and seek other occupations, sometimes not coming back to biogas construction.

But, even during the monsoon and during the day it mostly does not rain. A larger problem is the level of the ground water table, and a solution for this is very difficult to find. However, a number of coping strategies have been developed that could be adopted by other countries.

The problem of the rain can be easily solved by putting a simple bamboo structure over the construction pit and covering it with a sheet of agricultural plastic or oilcloth (canvas), the earth that has been removed functions as a dam. This is a simple and cheap solution for this problem.

If ground water is a problem the following solutions can work:

- Construct the bottom of the digester and the beginning of the wall for a large number of installations just before the monsoon begins. When the water table rises one can continue work in the (covered) pit, however, it is not easy or pleasant for the mason to work under these conditions, but it can be done. This obviously meets with another problem, like the users not wanting to invest and have to wait for one or two months for the construction to be completed, besides the nuisance of the open pit.

- Dig a deeper hole on the side of the pit, this drains for a while a not so high water table and makes it easier to pump.
- Use an electric pump powered by a car battery (800 litres per hour pump is enough).

Terminology

Throughout all biogas programmes one is using a different terminology that is imposed by the particular context of that country, but often is based on habit. The suggestion is to make the terminology more uniform for the ABP.

Throughout reports one uses the word “domestic” in the sense of “household”. While this is true, in this report the choice has been made for Household, because this provides more clarity, and it is recommended that this terminology should be adopted. The name of the Bangladesh biogas programme is “National Domestic ...” while it would have been more appropriate to call it “National Household ...”, because of the overlapping meaning of National and Domestic. The several meanings of domestic are:

- Of or relating to the family or household.
- Trained or bred to live with and be of use to people.
- Of, from, or within a country's own territory.

Another aspect is the use of “Programme vs. Project” indiscriminately, and this should be made uniform. For example, the Laos programme is called project, but this might have been a conscientious choice due to the size and development stage of the programme.

Yet, where there is more confusion is the terminology related to the physical biogas “installation”: Biodigester, Biogas digester, Biogas Plant, Plant, and Biogas Installation. While biodigester is a compact and elegant terminology, it can mean several technologies to produce gas, which are completely different from the anaerobic digestion of animal manure. In this report, it has been chosen to use “biogas digester”, except in Cambodia, because there “biodigester” is even in the title of the programme. Sometimes in this report “installation” is also used, for convenience, in order not to repeat the same word in one sentence.

1.3 MTR Team, Methodology and Justifications

MTR Team

The MTR had as Team Leader Mr. Júlio de Castro. In each country the team leader was supported by a local consultant:

- Bangladesh: Mr. Zakir Hossain.
- Cambodia: Mr. Sok Somith.
- Laos: Mrs. Silinthone Sacklokham
- Vietnam: Mrs. Nguyen Phan.

Throughout this report MTR Team means something different per country, for each country MTR Team is the combination of the team leader and the local consultant.

The local consultants have to a varying degree contributed to the country report. They also reviewed and commented the first draft for the respective country. However, the final responsibility of the whole report lies with the team leader.

The team leader is very grateful to the unconditional support received from his fellow consultants, their timely inputs and comments, and their professional attitude and cooperation. Their effort helped fine-tune this report to the real issues and needs of the respective country programmes.

Methodology

In order to address the objectives indicated in the Terms of Reference (ToR) [13], see Annex I, the consultants adopted a multi-faceted methodology which followed the pattern usual in such evaluations. First a desk review of all available documents has been undertaken to understand the general policy and implementation framework. After this, consultations and in-depth interviews with key stakeholders have taken place in every country to learn about expectations, limitations, challenges and barriers and to identify any lessons learnt from the programme implementation. Field visits to biogas installations have also taken place, to get first hand information from the beneficiaries of the programmes. In each country a final consultation with stakeholders has been held –which in two countries was a full fledged workshop, in the other two a stakeholders meeting- to review the findings of the mission and to have the stakeholders buy-in into the evaluation conclusions.

The activities mentioned in the ToR have all been carried out, but not in the same degree by country. This because the issues of each specific country, directed the attention towards, a number of those activities the others being less relevant for the country context of the biogas programme.

The MTR took place in the period June up to August and included two missions of 14 days: one mission covered Bangladesh and Laos, while the other one covered Cambodia and Vietnam. In September report writing took place.

Justifications

The team leader has made a number of choices related to this report, which will be explained here. These choices had also as background the requirement of the ToR to write a report with a maximum of 50 pages. As it can be seen this has been largely exceeded, due to the complexity of the programmes and issues for each country.

First, it was chosen not to present any country background or introduction, because this does not add any value to the report, only paper.

Second, it was chosen not to give a full fledged introduction of the Biogas Programmes per country and also of the objectives, unless these objectives could be commented directly and compared with the achievements. This for the same reason as above.

Third, it was chosen not to add any country annexes except the lists of people met, because otherwise the information was too much country related and not relevant to

other countries, and because in general no one reads annexes. Exception is an annex on networking (Annex II), which is relevant for everyone.

The organisation of the report

The report is organised with an introduction (Chapter I) and country reports (Chapters II to V). Each country is autonomous with a separation page as “cover”, country-specific acronyms and abbreviations and references. At the beginning of the whole report, there is the Executive Summary, Table of Contents and generic References. Chapter VI provides a review of the Partnership and Networking activities of the ABP.

References (Generic)

- [1] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. A proposal (draft) prepared for DGIS/DMW*. Den Haag, 22 November 2004
- [2] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Addendum to the proposal (draft) prepared for DGIS/DMW*. Den Haag, 7 April 2005
- [3] DGIS/DMW, Grant Document on the Asia Biogas Programme, dated 17 May 2005 (Reference: DMW/FK-381/05)
- [4] DGIS/DMW, Grant Document on the Asia Biogas Programme, dated 10 April 2006 (Reference: DMW/FK-308/06)
- [5] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Plan & Budget 2006*. Den Haag, January 2006
- [6] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Report 2005*. Den Haag, June 2006
- [7] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Revised Annual Plan & Budget 2006*. Den Haag, August 2006
- [8] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Plan & Budget 2007*. Den Haag, January 2007
- [9] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Report 2006*. Den Haag, May 2007
- [10] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Plan & Budget 2008*. Den Haag, November 2007
- [11] SMW (Castro), memo to DGIS/IB (Van der Ploeg) on *Bangladesh and Cambodia Biogas Programmes*, 7 February 2006
- [12] SMW (Castro), memo to DGIS/IB (Van der Ploeg) on *Laos Biogas Programme*, dated 3 May 2006
- [13] ToR MTR of the Asia Biogas Programme, SNV, June 2008

This page was intentionally left blank



**National Domestic Biogas
and
Manure Programme
Bangladesh**

Prepared by:
Júlio de Castro
M. Zakir Hossain

Acronyms and Abbreviations (country-specific)

BCSIR	Bangladesh Council of Scientific and Industrial Research
BDT	Bangladesh Taka
CPO	Construction Partner Organisation
ERD	Economic Relations Division
GoB	Government of Bangladesh
IDCOL	Infrastructure Development Company Ltd
LCPO	Lending and Construction Partner Organisation
LGED	Local Government Engineering Department
LPO	Lending Partner Organisation
NDBMP	National Domestic Biogas and Manure Programme
PO	Partner Organisation

Exchange rate

€ 1 = BDT 91.84

Chapter II – National Domestic Biogas and Manure Programme Bangladesh

2.1 Introduction

Based on a study conducted in 2004 and 2005, an agreement on the implementation of the National Domestic Biogas and Manure Programme (NDBMP) in Bangladesh was signed in May 2006 between Infrastructure Development Company Ltd (IDCOL) and Netherlands Development Organisation (SNV). The overall objective of the NDBMP is to further develop and disseminate household biogas in rural areas with the ultimate goal to establish a sustainable and commercial biogas sector in Bangladesh.

The Biogas Advisor from SNV started preparing the programme together with IDCOL in January 2006, and after signing the agreement the programme effectively begun working in July 2006. The programme was started with the signing of agreements with Construction Partner Organisations (CPOs) and training of their manpower.

In April 2005, a KfW mission visited the programme to appraise the possibilities for the provision of biogas credits to potential customers. This mission concluded positively, and on 22 December 2005, KfW signed a Financing and Programme Agreement with the Government of Bangladesh (GoB) to provide biogas credit over the period 2007 to 2010 as well as programme fund for the year 2010. Unfortunately, the KfW grant was not materialised by August 2008. IDCOL mobilised some of its own funds for providing loans through Lending Partner Organisations (LPOs) and Lending and Construction Partner Organisation (LCPOs).

Biogas digesters have gained popularity as an alternative energy source in the rural Bangladesh and were first introduced and installed in the country by the Bangladesh Council of Scientific and Industrial Research (BCSIR) in the early eighties. Thereafter, the Local Government Engineering Department (LGED) also started operating in the biogas sector. The GoB being the pioneer in this area has taken the initial trouble for promoting biogas technology in the country. Several non-government organisations (NGOs) also initiated biogas programmes and installed quite a number of biogas digesters in different parts of the country. Currently, GTZ under its renewable energy programme is implementing a commercial large-size biogas programme which has already gained popularity as a “commercial biogas venture” within rural and semi-urban areas.

In Bangladesh, biogas has already achieved remarkable success in terms of its multidimensional use. As of now, besides household biogas digesters, there are growing numbers of relatively bigger biogas digesters operating on commercial basis. These commercial biogas digesters use a large quantity of cow dung, poultry litters, human excreta, as raw materials and produce biogas for generating electricity. Large-size biogas digesters have good prospects to be used as an energy source for rural industries. Moreover, bio-slurry is a very useful organic fertiliser, a cost effective substitute of chemical fertiliser in Bangladesh. Therefore, biogas digesters are an

increasingly attractive venture in Bangladesh since the government has to utilise its limited natural gas resources for other purposes like power plants, vehicles, industries, etc., and also it is not an option to spread the gas distribution network all over the country.

Relevance to National Development Priorities

Bangladesh like other least developed countries, is currently facing an acute shortage of power and gas that resulted in slowing down the overall economic development and industrial growth. Although the on-going NDBMP will not have large impact in solving these problems, the programme provides inputs that can alleviate the impact of shortages of energy and increasing cost thereof for certain segments of the population. Development of a large number of biogas digesters at rural areas will firstly reduce the government's burden of further expansion of countrywide gas distribution network for the household consumption. As such, the existing stock of natural gas in the country could be best utilised in 'manufacturing and production activities' including power generation through private power plants. Moreover, biogas digesters have other important impacts like to contribute to the overall poverty alleviation and improved lifestyle of the rural people of the country. It has also a substantial impact on the national and global environment, health and hygiene of the people concerned. Rural infrastructure development is one of the national priority objectives of the government. Bio-slurry as a bi-product of biogas digesters is being utilised as an organic fertiliser in rural areas and thus increasingly bringing a substitute to chemical fertilisers.

2.2 Findings

2.2.1 Modest GoB ownership

IDCOL signed the agreement for the implementation of the NDBMP with the SNV. IDCOL, being an organisation owned by the GoB, NDBMP has obtained the implicit approval of the GoB. The programme contributes to many of the GoB's development objectives, encourages economic growth, contributes to developing a native energy source, benefits greatly many rural people, reduces the impact on the local environment, and reduces greenhouse gas (GHG) emissions.

Notwithstanding what is written above the programme has had little support from the GoB which translates in little ownership of the programme from the side of the government. Several issues demonstrate this finding.

Unlike other neighbouring countries, Bangladesh is yet to have a National Renewable Energy Policy in which biogas would have a role to play. This certainly limits the scope of the programme as there is no policy context for it. But, more important than policy, the country lacks a separate ministry or at least a Directorate specialised in renewable energy, therefore biogas has no institutional home. Obviously that this is a fact of life and is not only exclusive to the biogas programme, but it is limiting.

The GoB committed itself via the Economic Relations Division (ERD) - under the Ministry of Finance - to contribute with 15% of the total subsidy amount, in a MoU between KfW, IDCOL and ERD. While the agreement between KfW and the Government was signed in December 2005, KfW was yet to disburse its funds to the programme for refinancing. The delay in disbursing the fund is due to the long-pending process of execution of an agreement between the Government of Bangladesh and Government of Germany. Such non-conformity or non-compliance with the agreement may adversely affect the programme in the long run, but is an immediate signal insufficient ownership.

The MTR Team enquired with local KfW officials, but no concrete answer on the exact timeline of receiving such funds has been obtained, because this still depends on the ongoing discussions with the GoB. Till date, IDCOL is refinancing the Partner Organisations (POs) from its own funds. However, the programme may face difficulties for additional funds when the volume of required refinancing facility will increase.

The MTR Team also came to know that there are initiatives to begin with parallel biogas programmes, which seem to originate from the Ministry of Youth Develop and Sports and LGED⁷. Competition between programmes is good, the potential of Bangladesh is enormous, but if criteria for subsidies, quality, etc. are not uniform this will greatly damage the NDBMP that is trying to follow a serious and painstaking path for market development and sustainability. Again this proves the insufficient ownership of the GoB, and one should only fear the worst due to the lack of an apex organisation to guide the renewable energy sector.

There is a well known fact among the stakeholders in the biogas sector that a large quantity of the biogas digesters constructed by BCSIR in the past, is not working, or not working properly (this is not necessarily because of a technically faulty construction, but unfortunately it is so in most cases, and due to lack of maintenance services and proper users' training). These non-working digesters are a lasting remembrance to people that biogas does not work and that they should not invest in it, and therefore this fact is very much damaging a well-organised and encompassing programme like the NDBMP.

NDBMP is willing to address this problem and provide support to people to repair their digesters, often the problems are repairable. The POs are also willing because they can find an additional source of income by offering their services to people. But the MTR Team came to know that IDCOL got a message from "GoB circles" that IDCOL should keep their hands off from the installations of BCSIR. This is in the view of the MTR Team an unacceptable position because BCSIR does not own those biogas digesters, they belong to the people, and those are being penalised by their non-functioning installations. If really the GoB feels the NDBMP as its own programme, this should never have happened. This again can only be explained by the insufficient ownership of the GoB, and by the lack of an apex body for renewable energy.

⁷ This information was obtained from IDCOL and could not be verified with the mentioned organisations.

2.2.2 Target achievement

The feasibility study for the Bangladesh biogas programme shows that the potential number of biogas digesters is about 3 million. The MTR Team also strongly felt during the field trips and interactions with the representatives of the POs that there is a huge demand for biogas digesters; however, the programme is not attaining its targets, the actual number of constructed biogas digesters till the end of June 2008 under NDBMP is 4,595. The table below shows the gap between targets and actually constructed digesters.

Table 2.1 – Construction targets and actual implementation.

Construction target	2006	2007	2008	2009	Total
Implementation Plan (1)	2,100	4,200	12,500	17,650	36,450
Annual Plan (2)			5,400		
Revised Plan (3)	205	2,116	5,000	9,000	
Digesters actually built	205	2,116	(4) 2,274		

- (1) Original construction target as agreed in the Implementation Plan of January 2006 [1].
 (2) Annual Plan and Budget 2008 [2].
 (3) Strategy to achieve the objectives of the NDBMP, undated. [3]
 (4) Up to July 2008, Strategy to achieve the objectives of the NDBMP, undated. [3]

Even though the target has been reduced to accommodate the experience and project a more realistic biogas digester construction number, the fact is that even these reduced targets have not been achieved. The main reasons that could explain the low progress in construction are:

- There were two major natural calamities (floods and cyclones) that disturbed biogas digester construction.
- POs have less motivation due to less profit.
- Partners who have other priorities or core functions could not focus on biogas programme.
- Staff retention problems with the programme implementation unit and with POs.

Information provided by the staff of the NDBMP shows that the programme wants to follow the following strategy for achieving the target (the MTR Team comments are between brackets):

1. Sign contracts with new POs. Right now the programme has 30 POs and 15 of them are new. All necessary training has been provided to the staff of POs, and they have already started constructing biogas digesters (Attracting new POs and appointing two per district is a good strategy, however, the incentives problem should be solved otherwise after an initial spurt the interest for construction will decrease.).
2. The programme is planning to appoint two POs from each potential district (see above).
3. The present POs have limited capacity so it requires engaging small POs that have strong presence in local areas, and building up their capacity (To attract local POs is also a good strategy, but the rationale for being small is not quite clear.).

4. Price of materials and labour is increasing and subsidy is based on 2006 price levels. Programme intends to increase subsidy level (Increasing the subsidy makes the programme less sustainable. However, if the subsidy decreases strongly due to inflation of construction materials and labour, then subsidy should be revised - see section 2.2.4.).
5. The programme is planning to concentrate in more potential districts rather than spreading all over the country. In this line, concentrating in cluster areas will be continued in future (To concentrate in more potential districts is also a good strategy while the programme gains strength and confidence and awareness in the product grows, this also has a positive impact on the per unit programme costs. The economies of scale of concentrating in cluster villages can also be substantial, both for the programme and for the POs.).
6. Biogas appliances, especially stoves are in the process of improvement which will be more efficient and more attractive to the users (Concerning biogas appliances, the key word is giving "choices" to the customer, even though this comes at an extra cost that has to be paid.).
7. Carbon fund may be available soon and it is intended to make available part of this fund to the POs and that may attract POs for more digester construction (There is a new methodology under the Clean Development Mechanism CDM that can be applied for getting carbon credits⁸. However, the accounting period begins already in 2009, and credits can not be obtained for installations that are already build, only for installations that will be built in the future after approval by the CDM. Carbon funds can certainly be used to make the programme sustainable, to pay for programme costs, and fund the subsidies, including the incentives to POs.).
8. Slurry programme and training programmes may need to be sub-contracted to capable organisations (The slurry programme and training programmes should be sub-contracted to capable organisations - see section 2.2.8.).
9. To ensure the quality, maximum number of digesters will be inspected (See section 2.2.7.). Necessary research and development will be carried out.

There are other reasons that can explain the targets not being achieved. A biogas programme is different in nature and it is more difficult than most other renewable energy programmes because of its complex installation and lengthy implementation process. While designing the programme, customisation with local situation was not completely satisfactory as shown by the initial problems with the introduced design of the biogas digester, and that adversely affected the programme implementation and achievement of the numerical target. In the implementation plan, proper synchronisation between inputs and outputs was not well devised while setting the targets and estimating required resources to achieve the targets. In the five-year target data, it is observed that the number of digesters would increase like a manufacturing unit where capacity expands with the increased market demand. Again, there is insufficient indication about requirement of additional manpower and other resources to handle additional workload of the programme.

⁸ There are other mechanisms that trade on the voluntary market for carbon credits. One widely accepted methodology is that of the Voluntary Golden Standard. In either case it is not easy to get a project approved and the transaction costs can be very high.

At the initial stage, the programme suffered for regulatory hindrances, i.e. registration of SNV in Bangladesh as international NGO. Thereafter, the programme also suffered for its inherent “piloting approach”. From the very early stage, the programme progressed slowly like a pilot one, in which was actually not a new sector in Bangladesh. The mobilisation of required resources like programme advisers, programme staff, access to micro credit facilities, selection of adequate number of dynamic POs, etc. progressed slowly. Lessons learnt from the two previous similar programmes could have contributed to this programme, provided the NDBMP recognised some of their positive experiences.

On the other hand, IDCOL being the local counterpart did not have any prior experience and expertise with a biogas programme. Although IDCOL reported to have been successful in other renewable energy programmes i.e. solar energy, such experience could not sufficiently contribute to the efficient implementation of the biogas programme so far. Key programme staffs recruited at the initial stage did not have any experience in the biogas sector despite the fact that the sector is not new in Bangladesh.

Expenditure pattern as appeared in the financial statement of 2006 and 2007 also indicates a slow pace during initial stage. Of the total budget, the programme could spend only 45%, which indicates limited or least effort made during the early stage. The programme severely lacked preparedness at the initial stage to achieve its specific quantitative targets. Since inception, the programme lacked strong leadership from the side of IDCOL of a ‘visionary and well motivated professional’, besides the Executive Director and CEO of IDCOL who have other priorities. Again, due to absence of the SNV Bio-slurry Adviser till June 2007, management and utilisation of bio-slurry at field level was not cared for properly and slurry training remained unattended although it is a very important and one of the distinct elements of NDBMP.

Adequate means to achieve targets were not clearly identified and analysed properly from a realistic point of view. During the initial stage, the programme did not adopt any prudent operational guidelines incorporating proper partner selection procedures, quarterly performance evaluation and monitoring system, input-output relationship, etc. Till 2007, the overall implementation progress was far below the desired target. As of July 2008, the programme could achieve around 35% of its cumulative target, which does not support enough to foresee an extremely high growth rate in the coming months. Even an average 30% projected annual growth rate is not enough to achieve the target within the stipulated time frame.

2.2.3 Awareness and Promotion

The promotion materials developed by the programme are all of excellent quality and relevant for creating awareness on the technology and convincing people to invest in a biogas digester. This includes TV spots where the benefits of biogas adoption are correctly highlighted and in a very stimulating way. However, the MTR Team has been informed that most POs keep the information materials in their offices and do not

engage actively in promotion. On the other hand some POs give local people an incentive of BDT 200 for them to spread the message and bring new clients.

The NDBMP also organises village meetings where the benefits of the technology are explained, and the local POs record the interest of people and try to make them agree to sign a contract. The NDBMP also has participated in fairs, local events, and plans to use street drama as a promotion and awareness tool.

Continuous promotion and aggressive campaign using innovative themes and techniques should be pursued for increased awareness development. The existing promotional materials and campaign strategies are focused to the audience; however, the frequency of airing and the volume of printed promotional materials are not adequate for strong coverage and wider dissemination. Campaign programmes should be intensified on different occasions like festivals, village fairs, and Bazaar, etc. Folk song and Drama can be developed about biogas and played in various rural places where the villagers are gathering on different occasions. Famous folk singers and TV artists can be hired.

2.2.4 Subsidy and Loans

Subsidies

The Government of Bangladesh committed to contribute 15% of the programme subsidy, so far, no funds have been disbursed. However, IDCOL has contributed an amount of US\$ 1.0 million as refinancing through POs. Whatever financing is provided against subsidy comes from the Government of the Netherlands, funds that are being managed by SNV.

KfW was supposed to extend grants to this programme, and at a later stage also subsidies, when the SNV support for subsidies will end; however, no progress has been made so far in channelling these funds to IDCOL account due to policy and bureaucratic problems between the two governments. No specific deadline could be forecasted when the KfW funds will be available for refinancing. Therefore, once the programme gains momentum the requirement of additional funds for refinancing will increase substantially and if KfW funds are not arranged by that time, this may create huge problems for the programme and the POs will not be able to provide microcredit due to their funding constraints.

Currently the NDBMP is giving the following amounts as subsidies or incentives to users and POs:

- A user subsidy of BDT 7,000 is channelled through the POs, of which the user receives BDT 3,000 and the POs receive BDT 4,000 to cover the agreed service charge.
- Incentives for POs if they achieve 80% of their construction target in the amount of BDT 500 per digester.
- Refinancing loans to POs at very attractive conditions.

Subsidy being given by the programme is according to the POs not adequate. There is an increasing demand by the POs to enhance the amount of subsidy as well as the service charge of the POs for the installation of the digester. But this is a common feature of all biogas programmes all over the world: construction companies always complain that the subsidies are not enough. The problem is that the only objective way of assessing this is by performing a Financial Internal Rate of Return (FIRR) calculation but POs in general do not accept the logic behind it, and the user does not understand it.

Increase in construction costs

Another objective way of looking at the issue of the adequateness of the subsidy is to look at the increase in construction costs. The rationale behind is, that one looks at the original percentage of the subsidy when the programme started and compares it with the present level. Implicit in this reasoning is that the initial level was good but this is disputable for worse or for good. The fact is that the POs are lacking motivation and that the users are increasingly reluctant to invest.

The following table provides a comparison between the costs on July 2006 and May 2008 for a biogas digester of 2 m³ gas production per day.

Table 2.2 - Comparison of construction costs of a 2 m³ biogas digester in BDT.

Item	July 2006	May 2008	Increase (%)
Materials	14,148	18,024	27.4
Labour	3,500	3,700	6.5
Maintenance fee	700	700	0
Service charge	3,000	4,000	31.2
Total	21,348	26,424	23.8
Subsidy	7,000	7,000	0
Subsidy as percentage	33.9	26.5	

As it can be seen there was a substantial increase in the total costs of the digester (23.8%). The subsidy of BDT 7,000 has remained constant since the beginning of the programme; hence the subsidy percentage has decreased accordingly, however not dramatically.

It is mostly not good policy to increase the level of subsidies if one cares about the sustainability of a programme. Nevertheless, the fact is that the enthusiasm to construct biogas digesters is decreasing, but this might be caused by other factors, like general negative economic perception. If one takes into account the price increase then the subsidy should be adapted to BDT 8,958.

The POs are also demanding the release of the maintenance fee and of the warranty security which are kept with IDCOL against after sales service, and as a security to comply with the warranty. This release should not in any case be done.

Another aspect that the programme should look at is to include the (not so large costs) of the construction of a slurry drying shed in the cost calculation and increase the amount of the loan to accommodate this added expense.

FIRR

If one uses the cost indicated above for a 2 m³ biogas digester, and an average fuel savings of BDT 640 month, a maintenance cost of 2% of the capital cost, and 15 years economic life of the biogas digester, this gives a very high FIRR of 58%. This even without the huge benefits that can accrue from the use of slurry. From this perspective, the increase of the subsidy is not justified.

Loans

Even though the programme is not meeting its targets, the limited success it has up to now is derived from the fact that loans at preferential rates are available to finance the digesters, 60% of them are sold on credit (November 2007), and this percentage is increasing⁹.

The refinancing of the loan by IDCOL is dependent on size and not exceeding BDT 13,500 (€ 147¹⁰). The initial intention of the programme was that the LPOs for every loan to the user would contribute with 20% of the loan amount from their own funds. Because the trend is towards LCPOs, this has had as a consequence that while the POs want to reap the benefits of the financing facility, they do not have the financial capacity to support the 20% additional financing from own funds. This might change in the future when they will be able to capitalise due to the favourable conditions of the refinancing facility of IDCOL.

IDCOL loans are passed to the user under unfavourable conditions. Currently, POs are extending credit funds at 12-15% to the individual households for maximum 1-2 years, against which they are receiving refinancing from IDCOL for a 7 years term (6 plus 1 year grace period) at 6% interest rate. However, those households are in most cases only getting a 12 months term. This significantly affects the ability of certain segments of households and thus limits their willingness to install biogas digesters. The monthly debt service burden for individual households in case of shorter repayment period is much higher compared to a lower amount provided the term of loans is at least 3 years. Obviously that the POs do not complain in this case of the large benefit that they get from having this cheap source of capital.

The POs face problems with the late disbursement of loans and subsidy, because of lack of capital and this obviously limits their ability to build an increasing number of biogas digesters. The delay is due to on one hand a justifiable delivery and quality check, and on the other hand on the cumbersome approval procedure of IDCOL.

⁹ This is also a reflection of the fact that the early adopters are usually richer farmers, who can afford to pay cash, or do this because of prestige issues.

¹⁰ The implicit exchange rate is the one used by IDCOL (€ 1 = BDT 91.84).

2.2.5 Institutional issues and implementation model

Support of IDCOL for the financing of loans (in the interim while waiting for the KfW funds) has been essential for the achievements of the programme otherwise the success rate would be much lower.

IDCOL is the only link with GoB, but the MTR Team came to know that programme is almost unknown to the GoB. This can not be attributed to IDCOL, but is a sign of the little ownership and also of the mistrust that many people in the GoB have about the technology, due to the lack of knowledge about the benefits of it and of a number of failures of former biogas implementation programmes.

Another issue is that IDCOL management keeps comparing the biogas programme with the solar photovoltaic (PV) programme IDCOL is also implementing. One should be aware that one can not compare a biogas programme with a PV programme, but the IDCOL management might not have been aware of this when it embarked in the programme. A biogas programme is more difficult to implement than other programmes, because it is a technology built on-site, and the training of the user in the utilisation and maintenance is much more demanding. And if one wants to reap all benefits from biogas also slurry training has to be introduced, with adequate extension services, complicating even further the programme delivery. But, this is also the reason why there is a complete biogas management team at IDCOL paid by ODA money. Another crucial difference is that PV is an off-the-shelf product, quality is guaranteed ex-factory while biogas is built on location with all the consequences for training of qualified people and for quality control.

Programme Organisation and Management

The programme has no clear support from the GoB, which is essential to ensure long term sustainability and as such, institutional capacity building of NDBMP is strongly required. Currently, SNV is providing technical assistance which will end in 2009, though the lending programme through IDCOL will continue. In absence of a well defined institutional structure designed for the biogas programme and its activities, individual households may experience a similar situation as observed in the former BCSIR and LGED programmes. Therefore, IDCOL should explore the possibility to create a 'solid institutional structure' which could be an affiliated body of IDCOL to ensure operating a commercially sustainable biogas sector in Bangladesh.

The programme also suffered due to lack of a Senior Programme Manager who should have been available from day one, who could have been guided by the Senior SNV Adviser. From the observations, it was felt that the Senior SNV Adviser also carried out the task of Senior Programme Manager for some time; the programme somewhere lacked effective coordination, consultations and cooperation. Constraints of resource planning are still evident in the programme (for example, how the quality control of an increasing number of new digesters within certain time will be done, while speeding up disbursements).

Utilisation of programme resources needs to be more efficient. Physical infrastructures of the programme like office space, transport and communications facilities, etc. should

be used more efficiently in order to be able to handle an increased workload which is expected in the coming time. For example, there is no proper vehicle movement register to record staff movement for programme related activities. Furthermore, IDCOL needs to plan well ahead for more efficient utilisation of space as it may have more development projects in the pipeline.

Problematic working relationship

The MTR Team perceived a conflicting situation and became aware of many complains back and forth between the IDCOL management and the people directly working in the biogas programme.

For example one of the issues is that IDCOL feels that SNV treats IDCOL as their implementation office. This should not be the case, and it is not because IDCOL is the programme implementation agency, and SNV is a partner in this. The problem in the opinion of the MTR Team is related to the independence of the SNV people that the IDCOL management finds difficult to accept, being IDCOL a highly hierarchical organisation. The biogas programme staff itself does not see any problem in the working relationship with the SNV advisors.

Another aspect that contributes to the poor working atmosphere is the fact that SNV is renting¹¹ office space in the IDCOL floor, and that this space is not big enough and also sometimes has to be shared with IDCOL staff. On the other hand IDCOL argues that the NDBMP uses their Board meeting room for free. Also another issue that spoils the relationship is the use of the biogas programme vehicle which is seldom available for the biogas staff, while the IDCOL staff says that the biogas staff is using all three vehicles of IDCOL. This kind of “tittle-tattle” is typical for the atmosphere involving the biogas programme.

Some persons in the IDCOL management do not feel at ease with the fact that biogas programme money is kept in a separate SNV account, because this apparently limits IDCOL’s flexibility. However, when IDCOL’s management was asked directly by the MTR Team, it never made clear why and where the inflexibility was.

IDCOL management finds their management fee of € 5 per biogas digester too low, but on the other hand it keeps a disbursement procedure which is not appropriate for the biogas programme and makes their management costs indeed higher (besides delaying payments to third parties). It requires a total of 6 signatures (3 from biogas staff, 3 from IDCOL staff) to disburse for example a small amount of BDT 10,000, disbursement which has to be signed up to the CEO. This rigid bureaucratic structure makes sense for large amounts of money, but not for the mostly small amounts to be disbursed by the NDBMP.

This management fee is indeed too small because at the moment the numbers of biogas digesters constructed is very low, but when the programme grows, it will generate considerable income for IDCOL. IDCOL’s management continuously compares this fee

¹¹ This is another sign of insufficient ownership: in all other countries of the Asia Biogas Programme, office space is provided as a counterpart funding of the respective governments.

to the fee IDCOL receives for managing the WB PV programme, which amounts to US\$ 10¹², but one can not compare the two, because the biogas management programme costs are totally and additionally paid by SNV. If IDCOL would simplify its disbursement approval procedures and delegate financial disbursement power to the biogas staff (also IDCOL staff) this would very much reduce their management costs.

The big question underlying all these issues is that of the continuation of the support of IDCOL to the programme. The biogas programme is a small programme for IDCOL, and it apparently gives IDCOL a lot of issues to complain.

Staff motivation issues

The programme staff is well qualified with good academic background. However, individual members do not have enough room to develop their career in NDBMP. Currently, there is no well defined organisational structure with programme progression and hierarchy. As a result, it will be difficult to retain 'qualified and experienced staff' in the long run and this could be one of the reasons of staff turnover (6 people have already dropped out since the beginning of the programme). Moreover, the staff planning probably is not consistent with the increased requirement due to increased volume of workload to achieve programme's numeric targets. For example, what is the standard level of efforts of an individual quality control inspector in a given timeframe in dispersed locations? The programme lacks such detailed accounting and calculation of numbers of variables as stipulated in the implementation plan and this mathematical home work seems to be left. Eventually, this has affected and will also affect target achievement.

Also the qualifications of the people (like quality control technicians) are too high for the job, it is therefore not surprising that people get frustrated with the low level of responsibilities given to them and the undemanding character of their job. The working relationship between biogas programme staff and SNV advisors is excellent. The frustrations of the staff are due to the limitations imposed by the bureaucratic approach, and lack of operational decision autonomy and responsibility even for the simplest decisions.

Institutional and management issues related to POs

The programme started with three types of POs, namely, CPOs, LPOs and LCPOs. However, the trend for all types of organisations is to become LCPOs, which is to be explained by the larger benefits than can be accrued if one can combine the benefits of construction and the concessional credit provided by IDCOL. In this report they are all addressed as POs. The development towards LCPOs is a good one because it links credit provision with construction, and if POs do not deliver quality, people will not pay the loan back. On the other hand the programme is attracting institutions which are very small, do not have own equity and are learning the business of extending loans, with all hazards of this.

NDBMP initially selected 15 districts and targeted the rural areas of these districts for biogas digesters installation. Only 15 organisations were selected as the POs, of which

¹² At the time (July 2008) of the MTR Team visit € 5 was US\$ 8, not that big difference anyway.

10-11 were active. Out of these active POs, only a few had micro credit programme and the rest were construction POs having no credit facility for the household.

POs selection process appeared to be inappropriate both in terms of the number taken as well as legal entity, their financial strengths, operational capacity and branch network, significant differences in capacity from one to another are reflected during the bilateral meetings. In particular, inclusion of construction organisations as full-fledged partners extending micro credit was a less effective decision given the fact that they neither have experience in micro credit programme, nor they have enough manpower and branch network.

Other POs issues

Incentives being given to the POs as the service charge are not motivating for them, as appeared in the Operational Committee meeting observed by the MTR Team and from several interviews with the officials of the most active POs.

It is worthwhile to mention here that POs field staff is not provided with adequate transportation facilities and as a consequence, they could cover a lesser number of households. Self-financing of biogas digester installation is a very positive phenomenon indicating a real demand of biogas in rural areas. People are taking risks and if the digesters are not given proper maintenance support, the impact will be adverse for the programme.

Out of the subsidy of BDT 7,000, BDT 4,000 goes directly to the POs as a service charge, but BDT 1,000 is retained to assure that maintenance is provided (BDT 250) and that the warranty is honoured (BDT 750). POs are asking for this money to be delivered immediately, but then all enforcing power from the NDBMP would be lost.

Another issue is the lack of working capital, for example to cover costs until they are reimbursed from the programme (they have to wait for quality control and for the processing of the disbursement by the biogas programme and IDCOL), which happens after completion of construction. However, this is also a temporary issue that will be less relevant when the POs begin getting back the loans that they are now providing, due to the differential in term and interest rate between the loans they provide for the user and the condition of the loans they get from IDCOL (including a grace period).

One worrying feature for POs is the fact that qualified masons often leave, for two reasons. (1) they are not paid the year round because of the monsoon (see discussion in section 1.2 above), and (2) as soon as they get the certificate from the programme that they are qualified masons, they easily can get a job abroad.

POs complain that it takes a lot of effort and costs (travel) to convince people to install a biogas digester. This is always the case when a new technology is being introduced and these costs tend to decrease when the trust in the technology and the delivery mechanism grows. Experience from other biogas programmes shows that later on people begin demanding the biogas digesters. POs use this argument to ask for higher benefits, but these should not be given, except for a higher service fee.

Two appliances manufacturers

There are two by the NDBMP recognised stove manufacturers. Some POs also make some of the accessories, such as the centre pipe and the dung mixer, and this is a good development, if quality can be guaranteed.

KfW

The cooperation agreement with KfW is ready since 2006, but has not been approved because the GoB refuses to accept some clauses, especially that of tax exemption for foreign consultants that will be used in the context of this grant. IDCOL would be willing to pay this money from their own funds, but the agreement KfW – GoB is not only for this programme but is for a package of projects and this does not allow for a unilateral solution.

Agreement with SNV and IDCOL is valid until Dec 2009, from 2010 onwards KfW money would be the only one available. KfW total financing through the GoB is € 8.6 million (given as a grant to the GoB). IDCOL has to pay back to the GoB € 5 million (interest free loan), € 3.6 million are a grant to IDCOL to be used for subsidies.

Other actors

The programme is yet to bring all possible actors in the sector. To strengthen partnerships and networks, the programme may explore the possibility to involve more actors from the diverse fields who can contribute to the achievement of targets. Such actors may include vocational and technical training institutes, private training institutes, large-scale micro finance institutions having stronger country wide network, local municipalities or pourashovas, union parishads, national water and sanitation network, research organisations and consulting firms, etc. Finally, NDBMP needs to be a strategic institution involving all relevant institutions in their own domain. This could contribute to the greater achievement of programme objectives in the long run.

2.2.6 Capacity Development Services

So far, the quality of capacity building activities is found satisfactory. However, the number of training courses and participants needs to be increased in the near future. So far, training of masons and users has been satisfactory. While selecting participants for mason training, the capacity retention aspect was ignored. Users' training in slurry collection, management and utilisation techniques was insignificant in number. In all cases, involvement of vocational and technical training institutes and the existing administrative infrastructure and manpower of water and sanitation programmes with the local rural authorities are highly encouraged to gain momentum for the programme.

One of several competitive edges of the IDCOL biogas programme upon earlier programmes is the 'warranty and after sales services'; and this mechanism has certainly contributed to this programme positively in regaining the people's general confidence on the sustainability of the digesters which did not exist at all before initiating this programme. However, possibility of setting-up commercial maintenance centres of biogas digesters was not explored to ensure availability of the technicians at the rural level. The suitable technical persons from the existing workshops of agricultural

equipment, rickshaw and auto rickshaw at rural levels could be trained who are available as and when required by the households. The programme could build capacity of local maintenance or service centres that could be a source of their regular earnings like agricultural equipment.

2.2.7 Quality Control issues

Although the target number of digesters has not yet been achieved, the quality of IDCOL's biogas digesters is found all right as indicated in the findings of the recently undertaken users' survey [5]. The success rate of IDCOL's biogas digesters is almost 88%, the rest 12% digesters are not functioning due to inadequate feeding, but not due to major technical faults. Provision of five-year warranty and three-year after sales service with IDCOL's biogas digesters have contributed to create a stronger image. Also, the biogas stove and other equipment and accessories have been improved further with zero complains; however, households would prefer to have more options to choose these items. There were no major complains about the after sales service. A plasticised sticker with national phone number is given to the user, as a last resort to place complaints.

Quality control is an essential feature to build confidence in the product, and warranties and after sales service are important. The programme has set up a tight quality control system, and it disburses money after checking 50% of the digesters build. With more than 15 default points, POs get penalised and do not get the BDT 300 deposit back. When programme size increases it will be difficult to keep this level (50%) of control.

With increased targets, the programme should also organise its team for strong and systematic monitoring and close but cost effective supervision. IDCOL should explore the possibility of outsourcing the monitoring and supervision services to an independent professional organisation following the recently emerged private sector institutions. However, NDBMP needs to develop an efficient monitoring and supervision system using geographical positioning system. The programme office should have its mapping of biogas digesters as soon as possible which will help in the strategic decision making process. An independent organisation can be hired to develop this initial mapping of biogas digesters around the country. Finally, sudden field visit by the NDBMP and IDCOL staff should be part of monitoring and supervision activities.

2.2.8 Slurry Management

One of the key success factors of the biogas programme in the long run could be the promotion of efficient and profitable use of bio-slurry as organic fertiliser which is environment friendly and does not incur any significant amount of expenditure to the households. Importance of bio-slurry as a bi-product of biogas digesters cannot be under-stressed in a country like Bangladesh where chemical and non-organic fertilisers are expensive to procure. However, this matter was not widely addressed during the initial stage of implementation of NDBMP, to ensure dissemination and demonstration

of planned collection, efficient management and effective utilisation of slurry produced by the biogas digesters.

Although there are digesters where slurry collection and management are being handled efficiently, almost 98% digesters are not doing it due to several reasons like: (1) the NDBMP is not considering the cost element involved in the 'pit and shade construction', (2) limited user's training on organised slurry collection, management and preservation, (3) lack of research on bio-slurry, but this situation has been corrected, and (4) absence of proper policy guidelines. The MTR Team visited digesters where evidence was found on profitable use of bio-slurry and as such, it can be an attractive incentive for households that could generate cash flow at certain intervals from the sale of bio-slurry. The delays in bio-slurry extension have been caused by the fact that the Slurry Adviser was appointed at a later stage rather than from the first year. Nevertheless, the programme made excellent progress in research and development on slurry and its benefits.

However, slurry collection, preservation and utilisation need to be strengthened further. NDBMP in collaboration with Bangladesh Agriculture Research Institute (BARI) has undertaken an extensive research on 'bio-slurry and the possibility of its profitable use' and the findings of the research are quite amazing. However, the findings on the bio-slurry research should be widely disseminated within the POs, target beneficiaries and users' community. Wider and prompt dissemination of benefits of bio-slurry will promote the biogas programme to a large extent in Bangladesh because organic fertiliser is scarce and chemical fertiliser is expensive. Currently, only 233 owners which is only 14% of the digester owners received training on bio-slurry and only 8 Supervisors were trained. Slurry pit boundaries and pit cover for shade are not constructed properly and as such, slurry collection and utilisations is poor. The users should be informed about additional benefits of bio-slurry on the composed cow dung and poultry litters. Printed promotional materials and training manuals are of good quality and useful for the field staff of POs, however, more brief and simplified materials are required for the users.

2.2.9 Market Orientation and Sustainability

As mentioned earlier, SNV-IDCOL's biogas programme is having more positive sides compared to other previous programmes. Strengths, weaknesses, opportunities and threats of biogas programme in Bangladesh are explained below:

Strengths

- Biogas digester is easy to install with small amount of investment.
- Biogas is an environment friendly substitute of fuelwood and electricity.
- Bio-Slurry is an economically viable proposition that can generate regular cash.
- Biogas protects rural women from health hazards.

Weaknesses

- Installation of biogas digester is complex and challenging but less rewarding.

- Maintenance of biogas digesters is tougher than other renewable energy sources.
- Scarcity of required raw materials like cow dung, poultry litres, etc.
- Field staff involved in biogas programme do not take this job as a lucrative one.
- Seasonal variation is high in biogas digester construction.
- A certain area of land is required to install biogas digesters.

Opportunities

- Can be made a dependable alternative source of electricity for the rural households, with larger size digesters.
- Bio-slurry, as bi-product of biogas could replace chemical fertiliser in the long run.

Threats

- There is acute shortage of cattle in Bangladesh limiting the sources of cow dung.
- Heavy rainfall affects the digester installation process.
- Repeated flood could damage the biogas digesters.
- No scope for repossession of biogas digester in case of loan default.
- Staff turnover in biogas sector is very high.

Apart from IDCOL's biogas programme, only GTZ is currently involved in extending technical assistance and subsidy for large-size biogas development. However, they are mainly focused to commercial biogas digester development as part of their renewable energy programme. Commercial large-size biogas digester at village level could be a profitable business venture provided someone can organise and manage it in an appropriate manner.

Biogas programme has multiple interfaces and an organised approach of integrating all concerned parties is still absent. For example, biogas digesters utilises cow dung and poultry droppings, bio-slurry is the bi-product of biogas digesters which can be utilised at organic fertiliser and also can be used as fish feed, increased cattle farming gives increased quantity of milk, etc. These multiple interfaces could be integrated with the concerned ministries for maximum achievement and productivity. So far, no such institutional initiative has been undertaken by the programme that integrates these parties, towards a market-oriented approach.

2.2.10 Final Remarks

While on the one hand the programme has little GoB involvement, it is also of all ABP biogas country programmes the one that is more close to come to a market-oriented implementation of the biogas sector. The programme has only been able to operate due to the commitment of IDCOL in providing the necessary funds for the biogas loans that are lent to POs under very good conditions.

Even though the system of quality control is not as tight as in other countries the failure rate is low, but when the programme grows bigger, one should be more stringent in its enforcement. The work being done in the development of knowledge related to slurry

use and its standardisation is remarkable, and can be shared with other countries, as it already happened.

When the disputes in the programme management are solved and more responsibility and operational freedom is given to the biogas staff, together with improved financial rewards to the POs, the programme has a large potential to increase rapidly the construction figures. Obviously the availability of the KfW money is essential for the future of the programme.

2.3 Recommendations

Institutional and management

Related to the ownership of the programme by the GoB, it is recommended that SNV and KfW review their support to the GoB according to the findings of this MTR that there is little ownership of the NDBMP by the GoB. The two partners should discuss with the GoB the lack of fulfilment of their commitment to provide 15% support to the programme. The problems encountered around the provision of services by the newly trained masons to malfunctioning digesters built by BCSIR are another painful statement about the little ownership of this programme by the GoB.

NDBMP could have developed a strategic alliance with BCSIR and the NDBMP made several attempts to revive the malfunctioning biogas digesters of BCSIR; however, the concerned authority denied to handover (completely ignoring that the households who paid for these systems are the ultimate owners) those digesters leaving the problems with the owners. NDBMP should continue its persuasion in other indirect ways even through interference of senior government officials.

IDCOL should have a clear picture of its long term goal with the NDBMP and define its role accordingly in order to institutionalise the programme. IDCOL should strongly follow-up with the GoB (the same applies to KfW and SNV) for its 15% contribution to the programme. Organisational structure of NDBMP should be redesigned taking into consideration the extended workload and proper human resources planning.

For policy negotiation and dialogue with the concerned government authority, NDBMP should closely cooperate and coordinate with other development projects and donor agencies and jointly pursue for the separate policy for a renewable energy sector including biogas in Bangladesh. Close collaboration and cooperation should continue between NDBMP and the local research and development institutions for continuous improvement through extensive research and development activities. NDBMP should regularly interact with the key persons of the GTZ biogas programme and find areas where two programmes can cooperate, and exchange views and share best practices.

It is recommended that in order to lower the management costs of IDCOL its disbursement procedures should be streamlined and simplified, and that more operational and financial responsibility is given to the biogas programme management

(implying that they have been empowered with the capacity to manage funds, assess risks and comply with regulatory requirements on financing).

To improve the working conditions and motivation of the biogas programme staff it is recommended to rent a separate space in the same building even though this will cost more money.

Targets

It is recommended that the participation of SNV in the NMBMP to be extended for two years to allow for sufficient time to achieve the original targets and to gain time waiting for the KfW money.

The target of installing biogas digesters needs to be revised. To achieve the revised target within the limited time left, the programme management and implementation team should make a 'detailed strategic plan with timeline' indicating more accurate numbers (figures) for target, clear estimates of required resources to achieve the target, necessary man-days and man-hours to handle various tasks, annual promotional campaign and event management planning, transportation and logistics support planning, monitoring and evaluation planning using geographical information systems (GIS) indicating the location of the biogas digesters of NDBMP, etc. Required software and support facilities should be assessed and made available for prompt reporting, performance analysis through analytical reporting, monitoring, internal evaluation, and follow-up.

Subsidy and incentives

Due to the strong inflation and the decreasing lack of motivation of users to invest in a biogas digester it is recommended to increase subsidy to BDT 9,000, a 28.6% increase. It should be noted that the most common size digesters built in the past was 2.4 m³ and in 2008 the average size is slightly increasing to 2.7m³. It is recommended - while increasing the subsidy - to make the slurry pit and the shed for drying slurry mandatory.

Incentives being given to the POs like the service charge are not motivating for them. It is recommended to use the increase of the subsidy to increase the management fee of the POs to BDT 4,000, so that the user effectively gets BDT 5,000 in hand, because the motivation of the POs may even be a larger problem than that of the users. With this new increase in the cost (BDT 1,000) of the 2 m³, the new subsidy represents 32.8% of the total cost.

Even though the POs are demanding the immediate release of the after sales service and warranty funds kept by IDCOL, this should never be done, as it takes away any enforcing ability from the NDBMP.

It is recommended to include in the construction costs of the biogas digesters the small costs of constructing a shed for slurry drying. This construction should also be made mandatory, unless the users do not have the space to build one, neither use for the slurry. Include in penalty system penalty points for not building the shed, when made mandatory.

Loans

The current limitation that the loan amount should have a maximum of BDT 13,500 (€ 147) for all sizes limits the usefulness of this loan. It is recommended to set higher levels of the loan amount according to size of the biogas digester. It is also recommended to drop the requirement of 20% own equity, because most POs do not have the financial capacity to support this, and this is anyway already not happening. However, the conditions of the KfW grant should be evaluated as there might be clauses that do not allow this. Loans have a recovery rate of at least 90%, and many of the limitations imposed by IDCOL to its refinancing loans have to do with their worry for timely repayment of the loans. Taking into account the development nature of the biogas programme, and the large economic and social benefits to the country, the GoB should allow IDCOL to have a default rate of 10%, when paying the KfW money back to GoB.

While IDCOL is “encouraging” POs to extend the term of the refinancing loan to 5 years, it is recommended that IDCOL makes it mandatory to provide loans for at least 2 years (if the credit taker wishes a shorter period it should be allowed to). Also a cap on the on-lending interest rate should be introduced (for example 12%).

Because the POs have to wait for the subsidy and loan disbursement this creates large operational problems due to the lack of working capital, It is recommended to provide an advance on the loan and subsidy amount, for example a 25% advance based on the next 3-month target for that PO.

Quality Control

Capacity of quality control inspection team should be strengthened further through providing them with convenient, cheaper and less time consuming transport facilities (programme vehicle). With the current mode of transport and communication, neither the quality control inspectors nor the field staff of POs can attain efficiency and higher productivity.

The present goal of controlling 50% of the completed biogas digesters by the staff of the NDBMP is not sustainable because of its high costs. Therefore it is recommended to reduce this goal every year with 10% points until it gets to 10%. To discourage POs of delivering low quality digesters, the penalty systems should be on a weighted average basis, and if the POs continue with malpractices, finally they should be removed from the programme.

For example a PO builds 1,000 digesters per year, and 10% are randomly controlled by the NDBMP, and in this sample 5% default rate is found. Then, the penalties (differentiated by default level) should be imposed on 5% of 1,000 digesters, i.e., 50 digesters. This will regulated the market, but should not be done before the market is a bit more mature.

In order to be able to control digesters independently from the POs, a GPS identification of the digesters should be introduced coupled to a geographic identification system. This is also required for CDM verification.

Training and Extension Services

At this stage, more training courses should be organised for masons and supervisors; bio-slurry training should also be organised for the users. To create strong awareness, the existing users of NDBMP biogas digesters are the best persons who should be provided with financial incentives to motivate other households within their neighbourhoods who are yet to install biogas digesters. Among the users, the programme may identify 'Best Performers' in digester operation and maintenance, and slurry management who could be trained further as part-time technician.

More extension activities need to be undertaken at the rural areas to promote use of biogas digesters. Local human resources who are working for different departments of the government and ministries like livestock, fisheries, horticulture and nursery, irrigation and fertilisers, crop diversifications, rural electrifications bodies, forestry, etc., should be involved in the promotion and implementations of the biogas programme. Union Parishad chairman and other staff should be trained and provided with incentives to promote biogas programme within their locality.

Besides offering training on efficient slurry collection, preservation and utilisation techniques, NDBMP should also explore the possibility to provide technical support for slurry marketing. The users should be assisted with durable and cost effective packaging of slurry. NDBMP should also assist the interested POs like Grameen Shakti and others in obtaining policy support for slurry standardisation, quality control and certification, and marketing. More demonstration should be initiated for the farmers on the benefits of bio-slurry through involving the Department of Agriculture Extension. NDBMP can collaborate with Bangladesh Agricultural Research Council for policy advocacy and campaign on biogas and bio-slurry management, since the price of chemical fertilisers is increasing day by day.

POs

While selecting POs, major emphasis should be given on their business plans, financial soundness, institutional network and quality of core staff to be involved in implementing the plan. Since the POs are the main 'implementing vehicles', NDBMP should reassess the required number of suitable partner organisations in order to allocate the tasks of digesters installation towards achieving the target. The programme should explore the possibility of involving more partners. The existing network and institutional capacity of the Local Government (rural union council) can be involved as promoting partners. Adequate emphasis should be given on the institutional capacity building through training and other capacity building activities in order to boost up their performance. For example, POs with large volume of credit disbursement should be supported with required software for efficient maintenance of their financial information and data base, which will help NDBMP for external and internal reporting.

The POs as key intermediaries of the biogas programme should be given adequate incentive for their active participation and long term motivation. Such incentive may be given both in cash and in kind. Partner organisations those who perform well in terms of target achievement and strict quality adherence are already given an attractive incentive. IDCOL should directly reward the field level staff of partner organisations. Field staff should be facilitated with "low cost motorised transportation" so that they

can cover a wider remote rural area within shortest possible time. IDCOL may offer institutional guarantee for the partner organisations to arrange such low cost transports under a lease financing mechanism.

Other recommendations

Give users more options (at a cost) in choosing appliances, this increases market orientation and could provide POs with an extra income.

Many programmes are using PVC pipe instead of GI pipe successfully. In order to lower costs it is recommended to look if this effectively lowers costs, and how to solve related technical problems (such as when pipe gets clogged, and needs to be hand sawed).

In order to get more benefit from large-scale construction, it is recommended to look into the conditions for clustered (meaning simultaneous) construction of biogas digesters and how this can benefit the profitability of the POs.

It is recommended that the NDBMP takes the necessary steps to get carbon finance to make the programme sustainable (IDCOL should claim the credits, not any other participant in the programme). The example of Cambodia can be instrumental.

References

- [1] NDBMP Implementation Plan, IDCOL ns SNV, January 2006.
- [2] Annual Plan and Budget 2008, IDCOL/SNV, November 2007.
- [3] Strategy to achieve the objectives of the NDBMP, undated.
- [4] Reports on Construction and Quality Control of Biogas Digesters, NDBMP, February 2008.
- [5] Biogas User Survey 2007, CEGIS, March 2008.
- [6] Quality Control Procedure of Biogas Digesters, Sundar Bajgain, January 2007.
- [7] Construction Manual, IDCOL/SNV, April 2006.
- [8] Guidelines for Demonstrations with Bio-slurry 2007, NDBMP, September 2007.
- [9] Planning of Slurry Management and Utilisation Programme of NDBMP, June 2007 - December 2008.
- [10] Bio-slurry Management and its Effect on Soil Fertility and Crop Production.

List of Persons Met

No.	Name	Position
1.	Mr. M. Ehsanul Haque	Executive Director and CEO, IDCOL
2.	Mr. S.M. Monirul Islam	Deputy General Manager, IDCOL
3.	Mr. S.M. Formanul Islam	Director (legal) and Company Secretary, IDCOL
4.	Mr. N. Haque Faisal	Senior Manager, NDBMP
5.	Mr. Sundar Bajgain	Senior Biogas Adviser, SNV
6.	Mr. M. Fokhrul Islam	Bio-Manure Management Advisor, SNV
7.	Mr. Khursheed-Ul-Islam	Senior Advisor Sustainable Energy for Development, GTZ
8.	Mr. M. Khaleq-Uz-Zaman	Senior Advisor Sustainable Energy for Development, GTZ
9.	Mr. Tazmilur Rahman	Programme Manager Energy, KfW
10.	Mr. Absel Kamal	General Manager, Grameen Shakti
11.	Mr. M.S. Islam	Head, Department of International Cooperation & Development , Grameen Shakti
12.	Mr. M.A. Gofran	Biogas Consultant, Grameen Shakti
13.	Mr. Md. Ahashan Habib	Executive Director, SOUL
14.		
15.		



National Biodigester Programme

Cambodia

Prepared by:
Júlio de Castro
Sok Somith

Acronyms and Abbreviations (country-specific)

ACLEDA	Association of Cambodian Local Economic Development
CEDAC	Cambodian Centre for Study and Development in Agriculture
DAHP	Department of Animal Health and Production
DoA	Provincial Department of Agriculture
GoC	Government of Cambodia
KHR	Khmer Riel
MAFF	Ministry of Agriculture, Forestry and Fisheries
NBP	National Biodigester Programme
NBPO	National Biodigester Programme Office
PBPO	Provincial Biodigester Programme Office
PRASAC	Programme de Rehabilitation et d'Appui au Secteur Agricole du Cambodge
TS	Technical Supervisor
VAWH	Village Animal Health Worker

Exchange Rates used in this report

€ 1 = 6,000 KHR

US\$ = 4,000 KHR

€ 1 = US\$ 1.5

Chapter III – National Biogas Programme Cambodia

3.1 Introduction

In May 2005 the Ministry of Agriculture, Forestry and Fisheries (MAFF) and SNV signed a MoU on cooperation in a national biogas programme and since July 2005 a SNV biogas advisor is assisting MAFF in the preparations for the implementation of such a programme. In this period a National Biogas Programme Office (NBPO) has been established within the premises of the Department of Animal Health and Production (DAHP), a unit of MAFF. In January 2007, the minister of MAFF declared the NBP to be a priority programme.

The overall objective of the first phase of the National Biogas Programme (NBP) is the dissemination of household biogas as an indigenous, sustainable energy source through the development of a commercial, market oriented, biogas sector in selected provinces of Cambodia.

The specific objectives of the first phase of the NBP are:

- To increase the number of family sized, quality biogas with 17,500 in selected provinces.
- To ensure the continued operation of all biogas installed under the biogas programme.
- To maximise the benefits of the operated biogas, in particular the optimum use of digester effluent.
- Technical and promotional capacity development for further wide scale deployment of biogas technology in Cambodia.
- To strengthen and facilitate establishment of institutions for the continued and sustained development of the biogas sector.

3.2 Findings

3.2.1 Achievements

The following has been achieved by the programme:

- A biogas model suitable for Cambodian conditions (“Farmers’ Friend”) was identified and adapted for use by the average farming family. Professional drawings were made and quality standards established. For this a study [2] was commissioned that helped select and adapt the model. Further another study [4] was commissioned by SNV-ABP to compare the advantages and disadvantages of plastic biogas digesters.
- Biogas appliances designs with a proven track record were adapted to locally available materials and are now mass produced in Phnom Penh. The NBP is now

drafting the manuals and technical instructions in order to decentralise this production to the provinces, and will begin selecting appropriate workshops where this work can be done.

- Training curricula for new masons, refresher masons and supervisors were developed and a technical training centre established. 230 masons and 40 supervisors have been trained.
- Promotion material like posters, leaflets, DVD and TV spots are produced. The national network of Village Animal Health Worker (VAWH) has been trained as promoters and promotion agreements have been made with agricultural NGOs.
- A National Biodigester Programme office has been established in Phnom Penh and 7 provincial offices are operational.
- A biodigester credit scheme has been established under the PRASAC-Micro Finance Institution. Farmers can get a biodigester construction credit on favourable terms compared to common micro-credit.
- Over 2,800 biodigesters have been constructed of which over 99% are in operation.
- Besides the use of gas, most farmers make use of bio-slurry as fertiliser or fish feed. Over 1,500 farmers have received slurry extension services and 262 slurry model farms are established. The results of slurry use are very encouraging.
- Smooth running subsidy delivery channels are in place through the collaboration with the largest rural banking network and the largest rural MFI.
- NBP, through MAFF, has sold the VER rights of 5,000 biodigesters for a 10 year period. This will lead to an annual income for the programme of € 248,000.

The above achievements are very impressive. Further, this programme is running very smoothly and without conflicts between the NBP and the provincial offices, this is the result of having a very active Executive Committee that meets every month, many times frequently, the decisions of which are recorded and the high ranking officers involved in this Executive Committee immediately give follow-up to the decisions. The programme is clearly endowed with ownership of the Government of Cambodia (GoC), which can be seen in the following aspects:

- The GoC considers the NBP to be a National Programme.
- The GoC provides free and spacious accommodation space for the NBPO.
- The GoC very quickly instituted a Steering Committee that soon appointed an Executive Committee¹³, both being very involved in the day-to-day issues of the programme.
- Decisions of these bodies are immediately followed. For example, because one Provincial Office was not performing as expected, it was excluded and the implementation of the programme was attributed to a NGO.
- The MAFF involves actively all its departments in the promotion and extension of the NBP.

Another factor that may contribute to the success of the NBP is the very clear and strong Programme Arrangement and Implementation Document [6], which was prepared in 2005 during the preparation phase of the NBP.

¹³ It is constituted by the directors of the provincial programme offices and the main stakeholders (PRASAC, CEDAC, SNV) under the chairmanship of the Steering Committee Chairman.

The large numbers and the quality of several technical and organisational documents produced by the programme is impressive. Some of these documents can be of great utility for other programmes.

3.2.2 Targets and Users' satisfaction

The number of constructed biodigesters to be achieved by the NBP at the end of its timeframe is in itself a risk, because the lack of firm data makes it difficult to arrive at reliable predictions on effective demand and a more detailed analysis, supplemented by data from a survey on willingness and ability to pay has yet to be done. Also the critical mass development through promotion, marketing and the 'visibility' of constructed biodigesters and "Happy Users" has not yet reached the level in which large numbers of potential clients request for a digester.

Table 3.1 - Projected construction targets vs. achievement.

	2005	2006	2007	2008	2009	2010	2011	Total
Original Target (1)	0	1,000	3,000	5,500	8,000	-	-	17,500
New Target (2)	0	650	1,700	2,056	3,500	4,500	6,000	17,500
Achievement (3)	0	294	1,150	1,356	-	-	-	

(1) Data from [6]

(2) Data from [22], [12], [17]

(3) Data from [22], 2008 figures up to July

The table above shows the following:

- The programme expects to be extended by 2 years and is already planning ahead.
- It looks like that the 2008 target is going to be met.
- The construction figures per year are a way less than the projected figures in the implementation document, with the obvious higher programme costs per digester.

The reasons for this are -like in other programmes- that farmers needed a lot of effort and persuasion at the beginning of the programme to get convinced. Now, confidence in the programme is being established and the demand is picking up. However, the potential is large, as it showed a survey implemented by the Takeo Provincial Biodigester Programme Office (PBPO) in 100 communes that showed that 43,361 households had enough cattle to feed a biodigester.

Selection of the provinces

The NBP selected the provinces based on a number of strong criteria, and this contributes to the strength of the programme. A matrix was used to input and weight criteria like livestock numbers, availability of fuelwood, economic standards, number of households and distance to the capital for each province.

Kampot province was not in the initial ranking but NBP took some other factors into consideration for choosing provinces for further expansion of the programme. These considerations are:

- The quality of the agricultural extension network in the province.
- The quality of the micro-financing institutions in the province.
- The advice of the DAHP on the ability and willingness of the provincial Departments of Agriculture (DoA) to participate in the programme.

There is now a proposal for the extension of the programme to the Prey Veng province to be implemented by CEDAC.

Biogas users' survey

The NBP commissioned a Biogas Users' Survey published in July 2008 [19], which was of great help for the MTR Team. The results of this study further consolidated the findings of the Users' Survey done one year earlier [14]. In the following, the major findings, conclusions and recommendations of the survey are summarised. These very detailed surveys just confirm that the NBP is doing well and to a high user satisfaction, and this is also consistent with the observations of the MTR Team.

The survey found the average farm size above the national average. The general observations reported by the enumerators would allow for the hypothesis that most of the respondent households belong, in their rural context, to the "better off". The survey recorded a high degree of satisfaction on the part of the respondent households. All of the biodigesters were used, and the vast majority of the respondents judged "construction to be sound", stated that "results are convincing" and that "training was good". The performance of the digester was in line with the expectations of all of the respondents. No respondents considered the information received during promotion too optimistic about benefits although the costs turned out higher than expected and most were satisfied with the Programme's brochures.

The amount of biogas produced was perceived "as expected" and "more than expected" by some 90% of the respondents. The absolute amount of money spent on cooking fuel decreased by an astonishing 92% (from KHR 36,366 to 2,626 per month on average), and expenditure on energy for lighting by roughly 31% (from KHR 15,618 to 10,766 per month on average) with the biodigester. More than 90% of the households used biogas lamps, reducing the number of households using kerosene powered lamps as well as candles to a considerable extent.

With the biodigester, the number of households collecting fuelwood dropped by two thirds, reducing overall time spent for this activity by three quarters. This, and the fact that biogas lamps provide the opportunity to read after dark for about half of the households for the first time, it can be considered a significant improvement of the living conditions of respondent households.

Concerning the initial motivation to build a biodigester shows that bio-slurry was not a major incentive influencing the decision. Convenience of and time saved by cooking with biogas (including "less work to collect fuelwood" and "less smoke") was found the determining factor for building the biodigester (motivation) and the most important reason for the general content recorded. Convenience was more important for appreciation of benefits and general level of content than economic benefits, e.g. saving

energy costs, both in prospective and in retrospective, and perceived relevance of cost reduction diminished even further in retrospective.

Lighting with biogas is valued at a lower level but appreciation tends to increase in retrospective, i.e. after concrete experience with biogas lamps. Similarly, bio-slurry was appreciated more after concrete experience: 25% named "less fertiliser costs due to slurry use" as a reason for building the biodigester, 60% state it as a reason why they would build it again today.

3.2.3 Subsidy and Loans

The subsidy is passed through PRASAC if they provide a loan, otherwise the subsidy is transferred to the farmers via ACLEDA, which charges a very reasonable fee of US\$ 3 as processing costs.

The Executive Committee meeting of May 2008 decided to increase the subsidy from US\$ 100 to US\$ 150, effective from May 1, 2008. This decision was based on the strongly increased costs in 2008.

Table 3.2 - Variation of costs of biodigesters (US\$).

Period	Average cost of biodigesters	Subsidy provided by NBP	Subsidy as %
Jan - Feb	420	100	23.8%
Mar - Apr	638	100	15.7%
May - Jun	499	150	30.1%

The subsidy as percentage of the total costs has been increased very sharply. This is only admissible if one expects to maintain the subsidy constant during a number of years. Therefore, the NBP proposal that in order to compensate for future inflation, that the subsidy would have to go up annually with US\$ 25 from 2009 onwards, should not be followed. Furthermore the above percentages for the three periods given and for the smallest size, that of 4 m³ are respectively: 27.7%, 18.3% and 34.9%.

The cost of the 4 m³ biogas digester in December 2006 was US\$ 278 [16], in September 2007 was US\$ 348 [16] and in June 2008 was US\$ 430 [21]. This represents a sharp increase in costs, and the subsidy in percentage represents 35.8%, 28.7% and 34.8%. While the first percentage can be justified at the beginning of a programme, the second represents still a very good incentive, but the third can no longer be justified 3 years later.

FIRR

Another way of looking at the value of the subsidy is to make the calculation of the FIRR with the present costs and subsidy. Assuming:

- Average cost of the digester US\$ 499
- Subsidy US\$ 150

• Average fuel savings per month [14][19]	US\$ 11
• Average maintenance costs per year	US\$ 20 ¹⁴
• Annual interest rate	14.4%
• Lifetime of biodigester (years)	15

With the above data and for the biodigester financed without a loan, this would give the high FIRR of 47%. Without any subsidy the FIRR in this case would be 28%, still good enough. Evidently that the MTR Team is not in favour of eliminating the subsidy because this would very much de-motivate farmers to invest (they do not reason in terms of FIRR) and the NBP would lose its power to enforce quality standards. But the above calculation just reinforces the reasoning that the subsidy should not be increased, maybe until the end of the programme.

If one takes into account the costs of the loan, the FIRR with a value of 20% is low as compared to the opportunity costs of capital in Cambodia.

Credit

In Cambodia like in other countries active in the biogas programme, one considers biogas loans in terms of a non-productive or consumer activity. This situation however does not capture the true picture of the biogas digester investment and some effort should be put by the programmes to straighten this perception (see section 1.2).

The recently introduced loan by PRASAC will give a strong incentive for the construction of new biodigesters, especially for poorer households that do not have up-front cash availability. This new development was supported by a study [8] to assess the conditions for a biogas loan.

PRASAC managed to get a concessionaire loan from FMO on excellent conditions:

- Loan of US\$ 2 million, to be disbursed in 3 tranches, term 10 years.
- Interest rate of 4% per annum with no other fees.
- Repayment to be made in 10 semi-annual equal amounts with a 5-year grace period.
- PRASAC gets a subsidy of US\$ 50 per biodigester installed with a PRASAC loan to cover operational costs.

PRASAC is passing this loan to the biogas users on favourable conditions:

- Interest rate 1.2% a month or 14.4% a year.
- Term is between 4 months and two years depending on ability to pay of user.
- The principal repayment is flexible and is agreed with the user.

The subsidy given by FMO for the transaction costs given to PRASAC is very generous, and while this is supported by the average costs of providing a loan by PRASAC (also because of the royal salaries of their staff), this biogas loan does not involve high transaction costs or risks for PRASAC, all information on loan applications is sent to PRASAC and the bank only has to check the client history and do the risk assessment,

¹⁴ 4% of the investment cost, because of the maintenance of the biogas lamps.

and normally if a user is satisfied with the biodigester the default rates on biogas loans are very low.

Also the differential between the lending and on-lending interest rates and the grace period allow for a comfortable margin of profit for the institution. For this reasons it is quite disappointing that PRASAC is not promoting actively the biodigesters.

There have been complains that PRASAC is being very slow in processing the loan applications and this is certainly not acceptable, taking into account the large benefits it gets. PRASAC staff states that this was a temporary problem and most problems now are caused by a combination of wrong information on the client provided by the PBPOs or CEDAC, they often even can not find the client because the address given is not correct. This calls for a better communication between biogas field staff and the bank staff.

Another problem seems to be, that it is not clear for PRASAC staff who the PBPO supervisors are, some villages and communes have more than one supervisor. According to PRASAC, biogas field staff is informing people about the loan conditions and are giving wrong and misleading information which later causes problems to PRASAC during the loan negotiations. But, the NBP and PRASAC have developed together a biodigester credit information brochure. The information the PBPOs should provide to clients is in principle the one given in the brochure. The MTR Team also got the information that the problem might not be that of wrong information to farmers, but the special credit for biogas which can make farmers question PRASAC about the different rates of interest for other credits provided by PRASAC.

3.2.4 Institutional set-up

The choice of the programme to be implemented within the government structure proved to be a good one, especially because of the excellent cooperation of the NBP with all government institutions involved, the strong commitment of all involved and the open mindedness that is shown when government institutions are not working well and changes in the programme implementation structure are required. The structure of programme implementation which could serve as an example for other programmes is the following:

The **NBP Steering Committee** was established by the appointment of the Minister of MAFF. The Steering Committee meets twice a year for monitoring the progress and the approval of the annual plan as main topics. The Steering Committee Chairman also functions as Programme Director.

The **Executive Committee** consists of the Directors of the PBPOs, the NBP Coordinator, SNV Advisor and representatives of PRASAC and CEDAC. It is chaired by the NBP Director. The committee meets on a monthly basis to discuss the progress per province, problems faced by the PBPOs and possible solutions. From the minutes of the meeting a short monthly progress report is extracted, in Khmer and according to the Ministry's format, for submission to the Minister.

The **DAHP Advisor** to the programme is in daily contact with the NBPO management. His/her main task is to ensure the smooth introduction and execution of the Biodigester Programme within existing Government structures on National and Provincial level. Furthermore, the Advisor ensures effective communication between the NBP, DAHP and other Governmental offices.

PBPO set-up and staffing

The PBPO is the main implementing agency at provincial level. The PBPOs are hosted by the DoA - except for the newly added Kampot and the future Prey Veng Provinces - and also the staff is appointed by the DoA's director.

The PBPO coordinators are responsible for the daily functioning of the provincial programme and manage a group of 3-4 supervisors (depending on the size of the province and the potential for biodigester construction).

The supervisors are responsible for activities such as pre-construction workshops, quality control and biodigester completion control and in a specific area, usually 2 districts. Also the supply of biodigester appliances, which are not available on the regular market, are provided to the masons through the PBPO.

Regular assistance to the coordinator and supervisors is given by the NBP biodigester engineers while the NBP administrator pays monthly visits to the PBPO offices to control and support their administration.

While the DoA provides accommodation and the basic salaries of the staff involved in the PBPO, the programme has provided the staff members with training and the necessary hardware. The latter includes motorcycles, computers and other basic office appliances.

In one province (Kandal, one of the first 3 provinces to start the NBP) because the set-up described above was not working, it was decided to take away the implementation from the government and give it to CEDAC that took over the roles described above of the PBPOs. The progress figures and the collaboration/commitment level of the Department of Agriculture in Kandal, who were hosting the PBPO, was such that there was no further prospect in the continuation of the collaboration. This decision was made by the National Steering Committee on the recommendation of the NBP management. The handing-over process is now taking place and CEDAC will be responsible for the Kandal PBPO from September 2008 onwards. CEDAC has a good advantage that it works intensively with farmers because of other programmes that they implement. CEDAC also liaises strongly with commune council for the promotion of the biodigesters.

Programme costs

The activity costs are some € 900,000 higher than foreseen in the ABP budget proposal. This is mainly due to a far higher than expected inflation rate, the extension of the programme with 2 years which is not budget neutral, and to the fact that the subsidy costs have increased with € 500,000 (based on a US\$ 50 increase). The year-on-year

consumer price index in June 2008 amounted to 37% since January 2007 [Source: National Bank of Cambodia, Economic Research and Statistics Department].

The NBP states that this deficit can for a large part be covered with revenues from VER sales up to 2010 which amount to € 600,000. NBP states that these revenues will be used to cover the increased subsidy for farmers, partial payment of PBPO management and opening new provinces above the 6 target provinces.

The breakdown of the budget required for the remaining implementation period including 2008 is as follows:

Table 3.3 – Estimated budget breakdown (in € 1,000).

NBP Cambodia	2005	2006	2007	2008	2009	2010	2011	Total
(Biodigesters)	-	294	1150	2056	3500	4500	6000	17,500
Activity costs (ODA)	66	263	268	461	735	923	1,200	3,916
Farmers investment (excluding subsidy)	-	65	277	514	922	1,245	1,770	4,792
Government Contribution (1)	3	15	20	77	151	278	278	822
SNV TA	100	202	202	202	202	202	202	1,312
Total	169	545	768	1,254	2,010	2,648	3,450	10,843

Note: Figures for 2005, 2006 and 2007 are (estimated) expenditures, borne by farmers, government, DGIS and SNV

(1) Government contribution includes the revenues from VER sales (from 2008 onwards)

The extension of the programme with two years obviously increases the programme costs and the costs per digester. The estimation in the ABP document was that the programme costs (including subsidy, and excluding farmers' contribution) per biodigester would be € 177, but according to this budget it will be € 346, a huge increase.

The number of biodigesters to be completed with the subsidy of US\$ 150 since May 2008 will be 15,000 (estimated until April 30, 2008 is 1,056 biodigesters completed), this means that for subsidy US\$ 750,000 (€ 500,000) extra is required.

Taking into account above remarks about the wisdom of increasing the subsidy, the VER revenue could have been used to push the programme towards market sustainability, by putting more effort into privatising quality control, even though this can not be introduced at once. This also obviously would work to reinforce the credibility of the NBP, because one would have an independent quality control, which could be audited when need.

3.2.5 Training

Training in Biodigester Construction

Masons are identified and preselected by PBPO Technical Supervisors and the selection is based on vicinity of the masons to potential biogas users and interest of themselves to do construction work. A final screening of the selected candidates is done by the NBP technicians. The selected masons were then sent to a 10-day training course, which includes practical and theoretical sections, at Preah Kosamak Polytechnic Training Centre in Phnom Penh. PBPO Technical Supervisors were also trained by the Centre on biodigester construction skills. After the theoretical training, masons are asked to build two biodigesters - field training course which needed to spend around 30 days. NBP Technical Supervisors and PBPO Technical Supervisors provide close monitoring and technical support at the first and second biodigester construction. This monitoring and technical support is eventually reduced at the third and fourth biodigester as the masons have gained more confidence and skills in construction. The training provided by Preah Kosamak Polytechnic Training Centre is well organised and of high quality. The programme has trained 230 masons up to the present.

It was found that the biodigester construction standards are very well applied. However, some of the trained masons (22 out of 42 in Takeo province) were out of business because:

- Do not have any new biodigester to build after field training and they seek alternative income sources.
- Household customers demand reliability and wanted to contract the service from the most experienced masons who had constructed many biodigesters already after the field training.
- Did not have strong commitment with the construction work. Probably personal preferences and talent made them move out of the construction business.

Users' Training

Masons were actively involved in mentoring to biodigester owners on how to operate and maintain the biodigester and its appliances. Eight out of nine visited users stressed that both husband and wife could operate, maintain and feed the biodigester. At least two members of the family could do that. Some visited biodigesters were not adequately fed this maybe because the users expressed that they anyway had enough biogas to supply for their kitchen and light¹⁵.

Mostly masons provided coaching to male household head and after that the female household head was then coached by her husband to operate the biodigester. In a few cases, both wife and husband were coached at the same time by the mason. Selection of biodigester size is mostly based on the advice of masons, on the required demand of biogas of the users, and financial capability. Masons might want the households to build bigger as they will benefit more from their labour. Biogas users have not been clearly instructed on the consequences of not adequately feeding their digester. As

¹⁵ All the visited biodigesters were completed recently. Because the biodigester is fed initially with a huge quantity of fresh dung, it produces much more gas. The gas production will stabilise after some months.

result, they saved biogas by using less the biogas lamps and were cooking less time than desired.

Bio-slurry Extension Service

There is a handy workbook on bio-slurry management and usage for biodigester users to read, and the workbook was provided to the users. However, some of the visited users could not explain how to use slurry. On the other hand it seems that 90% of the farmers use the slurry, and one Provincial Director of the DoA even made it mandatory for all extension workers to promote slurry. The MTR Team observed that users keep the bio-slurry in an un-properly prepared pit without cover. On the other hand, all 6 visited biodigester users in Takeo province said that they took it to rice field for soil improvement, because the PBPO Bio-slurry Promotion Officer told them on its benefit to increase yields. However, it was not clear if the training was conducted formally by the PBPO Bio-slurry Promotion Officer. As elaborated in the remuneration policy, part of the revenue allocated to the office is also to be spent for bio-slurry extension services.

When biodigester users have well understood that bio-slurry will provide additional value to their existing raw cattle's dung or pig manure, they will manage and use it well to increase yields at home garden as well as rice production. This will put more weight in convincing the potential households to engage in biodigester construction.

3.2.6 Market Oriented Sustainability of the Biogas Programme

One overarching objective of the programme is to develop a commercial, market oriented, biogas sector in (selected provinces of) Cambodia, but this is still a goal to be achieved (see also section 1.2 for a general discussion on the issue). The biogas sector will always be a strongly regulated market with regulation from government. Therefore the role of government will always be enforcement of regulation because people must be protected from mischievous construction practices. Quality control and slurry extension are also basically non-commercial activities, which can not be left to market forces alone, even though the ones who benefit from it are the users.

The delivery mechanism of the NBP is still dominated by the PBPOs with a marginal role for the private sector in marketing and client relations. However it has become clear that the PBPOs have some serious limitations which will hamper the programme to achieve its overall objective. These limitations are:

1. The PBPOs are responsible for the implementation of the programme including construction. This is in conflict with their quality control function, at some places poor quality biodigesters are being hidden from NBP instead of working together to improve quality.
2. The capacity of the PBPOs is limited. A supervisor cannot handle more than 20 biodigesters per month if he has to do the sales and the quality inspections. This number will go further down as the quality control on after-sales service and guarantee workload is increasing. This stalls the growth rates needed to achieve the NBP objectives.
3. Commercial work like the sale of biodigesters is not a natural occupation for the PBPO supervisors. The PBPO staff has an agricultural background and many of

them are not good at marketing. This leads to a very low production in some provinces.

4. Besides their work for the biodigester programme, the PBPO supervisors are often also active with other programmes. This again limits the production capacity of the PBPOs.

The way the NBP is designed is already paving the way towards market oriented sustainability – there is an incentives policy, standardisation of design and of quality control, and the cluster approach – but this is not enough to ensure market orientation. All people involved are paid a standard incentive which was developed and agreed by all parties. A hard working Technical Supervisor (TS) at provincial level or of CEDAC can earn up to US\$ 380 per month. A mason can earn US\$ 45 per biodigester construction which is above their normal income by at least US\$ 10. The trained masons in both visited provinces, Takeo and Kampot are working individually. It is common practice that most biodigester users are identified by the TSs (PBPO in Takeo and CEDAC in Kampot) – meaning that the market is being created by the TSs. This means that trained masons are very much depending on the goodwill of the TSs to get work. But, what to think of the fact that while demand is increasing that 22 out of total 42 masons in Takeo were out of business? Can it be that the relationship of those masons with the TSs was not good, or it depends on the willingness of the masons to pay the TSs? Whereas, in Kampot, 29 out of 30 trained masons have actively continued their construction work. As explained by the CEDAC Coordinator, the demand is increasing and all masons could not respond immediately to the demand. CEDAC provides coordination and facilitation for the work of masons – division of work according to the villages.

As explained by CEDAC Kampot Coordinator, CEDAC is in a process to establish commercial groups by which farmers, CEDAC Enterprise Unit, and masons will be invited as shareholders in each district. CEDAC Technical Supervisors will work independently on quality control and supervised by CEDAC Development Unit. However, it is not clear yet the form of business to be set up and CEDAC recognises that they need external support from NBP or SNV's Private Sector Development Consultant.

There are four options for CEDAC and PBPO to commercialise biodigesters if clear arrangements and business plans are developed:

- (i) NBP and its PBPO will be autonomous state enterprises. This means that staff members who have worked for the biogas sector should work full time and to be paid by revenue generated by the service sold to farmers. All related administrative costs will also be covered by the profit. Key roles are:
 - a. Promoting through the existing VAWH networks.
 - b. Facilitating the biodigester construction which will be delivered by mason teams.
 - c. Providing quality control to the biodigesters.
 - d. Providing bio-slurry and animal husbandry extension services.

Anticipated impact: nationwide.

Challenge: Does the government want to go with that?

- (ii) CEDAC-Enterprise is a good idea to continue the development of the biogas sector in Cambodia. It should not be limited to CEDAC alone but other interested NGOs who are willing to take up this initiative. Key roles for the NGOs could be:
- a. Promoting through existing self-help groups or target households.
 - b. Facilitating the biodigester construction which will be delivered by mason teams.
 - c. Providing quality control to the biodigester.
 - d. Providing bio-slurry extension services and other integrated development projects (i.e. agriculture technique, animal husbandry techniques, micro credit, business development,..).

Anticipated impact: limited to areas where NGOs or CEDAC are working.

Challenge: Will the NGOs or CEDAC be required by the Government to register as commercial enterprises?

- (iii) The biogas development programme should be handed over to the existing enterprises through a public bidding process. Bidders should be encouraged from well qualified mason teams across the region. Key roles for the enterprises are:
- a. Promotion by various means in their localities.
 - b. Facilitating the biodigester construction which will be delivered by mason teams.
 - c. Providing quality control to the biodigester.

Anticipated impact: limited to areas where there is emerging demand.

Challenge: Can the qualified mason teams formulate business plans and get investment and working capital to start their business?

- (iv) The promotion of biogas development should be done by both option 1 and 2.

The NBP is presently developing the framework for private sector involvement and commissioned a Private Sector Development Study. The focus of the consultation will be on the development of a sustainable biogas sector with particular attention to Private Sector Development (biodigester companies for marketing, construction and after-sales service). Through a stronger role of the private sector with a clear separation of construction and quality control functions, the construction capacity is expected to go up, the quality control procedure will improve and one should arrive at a sustainable biogas sector.

The contractors and presently trained masons can not by themselves calculate construction cost. It may be that present costs of the digesters require to be adjusted for overhead costs, write-offs and a management fee/profit. However, these management costs can be compensated by scale efficiencies when there is an enough large market, like buying materials in bulk, provided they have equity or access to cheap credit, organising more efficiently the work of masons, providing after sales services more efficiently, etc. In a commercial market these companies will have to compete with each other and with individual masons, therefore they can not be treated differently.

A fact is that the current pool of masons does not possess the skills required to become entrepreneurs, therefore they will need training in business skills such as accounting, book keeping, etc. A minimum team set-up to be able to work as a contractor is

supposed to require 4 to 5 people who are at a level of semi-skilled to skilled in construction work. The NBP-masons who are interested to develop into small contractors expressed the need for support on various issues [13]:

1. A minimum set of tools, equipment and a motorbike and trailer is required to work as a small contractor. The investment for this is estimated per set at an average of US\$ 590. The NBP-masons lack the money for this kind of investment.
2. Access to training on topics such as: book keeping, cost calculation based on drawings and bill of quantity, management and administration.
3. Support in introduction as a qualified NBP-mason cum contractor to District officials, but preferably also to Commune and maybe to the Provincial officials.

3.2.7 Final remarks

The NBP is doing extremely well, is well organised, all the building blocks to grow towards a market-oriented programme are in place or are being developed.

The targets are not being met, the NBP needs more time to consolidate achievements, an extension of two years is advisable (is already being done).

The quality of the capacity building is high (construction and quality control), and this translates in a high percentage of biodigesters working. The NBP states that it does not accept any biodigester not working for technical reasons, that if there is a problem that this has to be solved.

People seem to value mainly the “blue flame” and its convenience of use. This aspect should therefore be more prominent in national promotion. One should sell a biodigester like any other commodity: modern, nice, improves quality of life, etc. But, it is also different from selling a TV or a mobile phone, because with these, people have much more information (communicated by brands). Not so with biogas. Also the rotation time of TV or Phone are short, whereas a biogas system is bought for life. This means that quality control always has to be there in biogas, and these (non-commercial) costs will always be there, and somebody has to cover them.

3.3 Recommendations

Programme extension

The MTR Team recommends extending the programme with 2 years. This measure is already anticipated by a decision of the Executive Committee of the NBP.

Subsidy and credit

The subsidy has been increased very sharply mid-2008. The MTR Team recommends not to change the subsidy for the remainder of the programme unless, construction inflation reduces the subsidy percentage for the 4 m³ size below 25%.

Taking into account the remarks about the wisdom of increasing the subsidy, the VER revenue could have been used to push the programme towards market sustainability, by putting more effort into privatising quality control. This also obviously would work to reinforce the credibility of the NBP in the GHG emissions trading market, because one would have an independent quality control, which could be audited when needed.

Due to the fact that the loans provided by PRASAC are highly profitable for this institution it is recommended that the NBP negotiates with PRASAC on a more proactive role in the biogas programme.

It seems that there are problems with communication and logistics between biogas field staff and PRASAC staff, which delay the approval of the loans. This problem should be addressed and solved (by all partners involved). It should be clear to PRASAC who is the biogas field officer involved.

Masons' Training

The selection procedure of the potential masons to be trained should be improved. It is strongly recommended that an advertisement in the area should be posted to seek for the most interested and dedicated candidates to apply for the mason career. This will help to screen only for the right persons to be interviewed before sending them to the training centre.

The trained masons should be encouraged to work in a team of at least three to five (in one district) to ensure sustainability of the trained capacity for the supply of services in the area and for keeping everyone trained in the construction business. Capacity building to enable them to operate as a team will then be necessary.

To build trust amongst prospective households, a registration of the mason teams at their commune council or district level, or at the department of commerce should be encouraged.

Users' training

Biodigester users should be explained precisely on how to feed the biodigester and also on how many animals are required to sustain the supply prior to any construction begins. This is as important as financial capability and family size (or demand) to choose the size of the biodigester. The household might sell all their cattle to buy a ploughing tractor for rice plantation. But, raising cattle remains a good investment (less risk bearing if compared with other livestock raising) to earn extra income as well as to sustain the supply of the biodigester. The consequences of not feeding correctly the biodigester should also be explained while choosing the right size of the biodigester.

Animal husbandry techniques are therefore vital for the operation of the biodigester – when biodigester users can apply the learned skills or have access to better and affordable husbandry services. A link of this component/service to the biodigester should be developed: *healthy animals, healthy biogas, healthy crops, and health and wealth of the users.*

Bio-slurry extension training

The NBP commissioned recently a very thorough study [20] of the bio-slurry extension work in the country. The MTR Team fully supports its recommendations. Additionally the following is recommended:

- PBPO Bio-slurry Promotion Officer should organise a training (or field exposure visit to a model farm) for biodigester users after their biodigester has been constructed. The invitation for the bio-slurry training should be directed (if possible) for both husband and wife.
- A checklist for the bio-slurry management and usage should be developed that farmers could easily fill in to follow on their accomplishments.
- Building proper bio-slurry pits and making a shed should be a condition imposed on users if they want to get the subsidy (unless impossible to built due to reasonable factors).

Market orientation of the programme

In the findings section 4 different avenues are proposed for making the biogas sector more market-oriented. However, the NBP has commissioned a study on the subject and for this reason the MTR Team is careful in making recommendations because that study will analyse more in depth all options. Nevertheless, the following things can be recommended:

- (1) The MTR Team recommends that business development should take into account the low level of the people involved and the very simple nature of the businesses to be created.
- (2) The MTR Team recommends that the following avenues for reducing the role of PBPOs and enhancing private sector participation are tried:
 - Reduce the role of the PBPOs in mason selection. Per province a list of certified biogas construction companies and masons should be available with contact details. These lists should be publicised either through newspapers and other media, and/or given to the households after the initial contacts of the PBPO officials or any other promoter has taken place.
 - The present tripartite contracts with individual NBP-certified masons should be replaced with 'normal' contracts of only accepted construction companies or certified masons directly with the clients. The role of the government in this case would be limited to mediate in conflicts, but even for this there are other institutionalised avenues. A condition is that a national telephone number exists where people can complain.
 - The NBP should develop in one province a concept of a privatised quality control of construction and after sales service, at an appropriate time in the programme future. This would be a kind of auditing company that would provide the same quality control functions as the PBPOs or CEDAC. Any NGO or business could apply for this work, and this can be done in a bidding process. For sure that the random sampling quality control at national level should be continued to ensure transparency and quality. Evidently that this also would have consequences for the way the warranty and after sales service are guaranteed¹⁶.

¹⁶ The present arrangement is that a warranty on biodigester construction of 2 years, and also after sales service of 2 years is given, implying that the mason visits the installations every 6 months (3 times)

Other recommendations

Documents: The NBP has been producing documents on several biogas implementation aspects that merit to be spread to other programmes. Also its database for monitoring is of high quality and with a version in English, which could easily be adapted by other countries.

Promotion: Related to promotion one should put more emphasis on the value of slurry and on the increased agricultural productivity and reduced costs of chemical fertiliser, this means to highlight the income generation potential of biodigesters.

People seem to value mainly the “blue flame” and its convenience of use. This aspect should therefore be more prominent in national promotion. One should sell a biodigester like any other commodity: modern, nice, improves quality of life, etc.

GPS: It is also recommended to begin with the identification of the biodigesters with a GPS in order to eventually input the data in a GIS, and facilitate the monitoring of the biodigesters.

or whenever requested. A final control is done after 2 years and if the biodigester is working properly the mason gets the After Sales Service fee back. If not repairs have to be made, the costs of which are divided between the mason (40%) and the PBPO (60%).

References

- [1] Cambodia Biogas Feasibility Study, January 2005
- [2] Evaluation Study for Biogas Digesters Designs, September 2005
- [3] Annual Plan and Budget 2006, November 2005
- [4] Survey of Plastic Bag Digesters in Cambodia, December 2005
- [5] Programme Arrangement and Implementation Document, January 2006
- [6] NBP information folder, February 2005 with several updates
- [7] CDM Baseline study on fuel use and manure management, August 2006
- [8] Assessment of the Conditions for Linking Microfinance to Household
- [9] Jan – Jun 2006 progress report and July – Dec 2006 activity plan revision, August 2006
- [10] Biodigester Construction in Cambodia, October 2006
- [11] Annual Plan and Budget 2007, November 2006
- [12] Annual Report 2006, February 2007
- [13] Private Sector Development Study, May 2007
- [14] Biodigester User Survey 2007 Report, June 2007
- [15] Jan – Jun 2007 progress report and July – Dec 2007 activity plan revision, August 2007
- [16] Annual Plan & Budget 2008, November 2007
- [17] Annual Report 2007, January 2008
- [18] Description of Approach, Methodology and Work Plan of the Private Sector Development Initiative, June 2006
- [19] Biodigester User Survey 2008 Report, July 2008
- [20] Improving the Effectiveness of the Slurry Extension Component of the NBP in Cambodia (Slurry Extension Evaluation Study), July 2008
- [21] Jan – Jun 2008 progress report and July – Dec 2008 activity plan revision, July 2008.
- [22] Position Paper NBP for MTR, July 2008.
- [23] MoU NBP with ACLEDA Bank on subsidy channelling, June 2006.
- [24] MoU NBP with CEDAC on cooperation in biodigester dissemination, March 2007.
- [25] Minutes of the monthly Executive Committee (NBP management, Steering Committee and PBPO Directors) meetings since May 2006.

List of Persons Met

No	Surname and Name	Position	Institution	Contact Address
1	Mr. Jan Lam	Technical Advisor	NBP	Phnom Penh Office
2	Ms. Lam Sao Leng	Program Coordinator	NBP	Phnom Penh Office
3	Mr. Chheng Ratanak	Admin & Finance Manager	NBP	Phnom Penh Office
4	Mr. Kong Kea	Bio-slurry Promotion Officer	NBP	Phnom Penh Office
5	Mr. Khlouk Himoney	Technical Supervisor	NBP	Phnom Penh Office
6	Mr. Chhum Vuth	Technical Supervisor	NBP	Phnom Penh Office
7	Mr. Nget Sokhorn	Technical Supervisor	NBP	Phnom Penh Office
8	Ms. Som Kunthea	Admin Assistant	NBP	Phnom Penh Office
9	Miss. Keo Kanthy	IT & Database Entry Officer	NBP	Phnom Penh Office
10	Mr. Prak Sara	Driver and Stock Controller	NBP	Phnom Penh Office
11	Mr. Sok Daro	Program Coordinator	PBPO	Takeo province
12	Mr. Seng Meng	Administrator	PBPO	Takeo province
13	Mr. Noun Vantha	Technical Supervisor and Biogas User	PBPO and Beneficiary	Takeo province
14	Mr. Keng Savuth	Mason	PBPO Trained Mason	Prey Pha Or village, Roneam commune, Treng district, Takeo
15	Mr. Nim Lampy	Mason and Biogas User	PBPO Trained Mason and Beneficiary	Kdei Ron village, Khvao commune, Treng district, Takeo
16	Ms. Ty Neu	Biogas User	Beneficiary	Typatt village, Cheang Tong commune, Tamkak district, Takeo
17	Mr. Nak Nim	Biogas User	Beneficiary	Tamom village, Tapen commune, Tramkak district, Takeo
18	Mr. Khin Daravuth	PBPO Manager	CEDAC	Kompot province
19	Mr. Rath Darith	Field Coordinator	CEDAC	Kompot province
20	Miss. Un Kunthea	Accountant	CEDAC	Kompot province
21	Mr. Keo Sorey	Technical Supervisor	CEDAC	Kompot province
22	Mr. Lay Thou	Technical Supervisor	CEDAC	Kompot province
23	Mr. Mam Veasna	Biogas User	Beneficiary	Sre Treng village, Watt Ang Khang Cheung commune, Banteay Meas district, Kompot
24	Ms. Chom Sokha	Promoter	CEDAC	Watt Ang Khang Cheung commune, Kompot
25	Mr. Keo Som Ol	Mason	PBPO Trained Mason	Chhouk district, Kompot province

No	Surname and Name	Position	Institution	Contact Address
26	Mr. Vich Sovath	Biogas User	Beneficiary	Taten village, Somroang Krom commune, Banteay Meas district, Kompot province
27	Mr. Kunthea	Biogas User	Beneficiary	Taten village, Somroang Krom commune, Banteay Meas district, Kompot province
28	Mr. Say Sony	Marketing Manager	PRASAC	Phnom Penh
29	Mr. Sum Sinath	Branch Support Manager	PRASAC	Phnom Penh
30	Mr. Neang Skhim	Credit Manager	PRASAC	Phnom Penh
31	Mr. Phil Psilos	Consultant	Private Sector Development	#1, Str 29, Tonle Basac, Phnom Penh, Cambodia
32	Mr. Richard Pullen	General Manager	Development Technology Workshop (DTW)	Unit 17AB, St. 528, Toul Kok, Phnom Penh, Cambodia
33	Mr. Lang Heng Horng	Executive Director	CEDAC	Phnom Penh
34	Mr.		CEDAC	Phnom Penh
35	Mr. Hem Chantha		Kosamak Training Center	Phnom Penh
36	Mr. Sao Or		Kosamak Training Center	Phnom Penh
37	Mr. Sean Thuch		Kosamak Training Center	Phnom Penh
38	Mr. Chum Vang Chann		Kosamak Training Center	Phnom Penh
39	Mr. Im Keo		Kosamak Training Center	Phnom Penh
40	Mr. In Sathoun		Kosamak Training Center	Phnom Penh
41	Mr. Taing Yoeun		Kosamak Training Center	Phnom Penh
42	H.E Nou Muth	Under-Secretary of State for MAFF	Ministry of Agriculture, Forestry, and Fisheries	Phnom Penh
43	Dr. Sar Chetra	DAHP Advisor	Department of Animal and Health Promotion	Phnom Penh
44	Mr. San Vanty	Deputy Director General of MAF	Department of Animal and Health Promotion	Phnom Penh



Biogas Pilot Project

Lao PDR

Prepared by
Júlio de Castro
Silinthone Sacklokham

Acronyms and abbreviations (country-specific)

BPP	Biogas Pilot Project
BPPO	Biogas Pilot Project Office
DAFO	District Agriculture and Forestry Office
DLF	Department of Livestock and Fisheries
GoL	Government of Laos
LAK	Laos Kips
MAF	Ministry of Agriculture and Forestry
NAFES	National Agricultural and Forestry Extension Service
NAST	National Authority for Science and Technology
NAFRI	National Agricultural and Forestry Technical Research Institute
PAFO	Provincial Agriculture and Forestry Office
PBPO	Provincial Biogas Promotion Office

Exchange rates used in Lao report

€ 1 = LAK 13,450

US\$ = LAK 8,590

€ 1 = US\$ 1.56

Chapter IV – Biogas Pilot Project Lao PDR

4.1 Introduction

The Lao Biogas Pilot Project (BPP) was established with the signing of a Project Agreement by the Ministry of Agriculture and Forestry (MAF) and SNV in November 2006. This followed 2 years of consideration and feasibility studies by SNV to determine if a biogas project would be effective in Laos, how it should be designed, and which organisation would be the best implementing partner.

In March 2007 the Biogas Pilot Project Office (BPPO) was established within the Department of Livestock and Fisheries (DLF), and overseen by the BPP Advisory Board consisting of representatives of each of the relevant Government Ministries and other organisations such as Lao Women's Union and the National University of Laos.

The biogas project fits well into and contributes in varying degrees to the strategic objectives of the MAF for the period 2006-10, being food security, production of commercial crops, reducing slash and burn cultivation and sustainable forest management.

The strategy of the MAF for the forestry sector is to increase the forest land area to about 53% in 2010 and 70% in 2020. Moreover, the new Forestry Law of 2008 defines three categories of forests: protection forest, preservation forest and production forest. The first and second types of forests are prohibited for household uses and use can only be allowed for some areas and with the permission from the authorities. Consequently, the strategy of the government on increasing the forest cover, the extension of the agricultural land, hydropower projects and mining industry will limit the rural population's access to the forests for household consumption as well as a source of energy.

4.2 Findings

The BPP is still a very recent undertaking, and therefore many of the findings below should be seen in this context. The project still did not have time to mature and is still at the stage where the institutional arrangements and implementation partners are being trained and capacities developed.

4.2.1 Project achievements

The main results achieved up to July 2008 by the BPP are:

- Total of 166 household biogas digesters installed to the end of June 2008. Total target for 2008 is 800, then increasing each year towards a total of 6,600 by the end of 2010.

- A Quality Control system has been put in place including documentation, processes, training, monitoring and officer incentives.
- An internal quality control audit was conducted in mid 2007 with positive results.
- A Biogas Users' Survey was conducted in December 2007 that indicated generally very high user satisfaction and awareness of benefits received from their systems.
- The original construction target for 2007 of 110 systems was achieved by the end of December 2007.
- 59 masons in total have been trained as biogas technicians.
- This includes 5 masons from private companies that may be interested to get involved in biogas installation as part of their business in the future.
- 18 District government staff have been trained to conduct biogas promotion, and also quality control inspections during biogas construction.
- The project has established capacity and operations in the provincial department of DLF in Vientiane Capital, including the training of 3 Provincial Biogas Promotion Offices (PBPOs) officers to run their programme, and has expanded to a total of 7 districts.
- The project has expanded to a new province – Savannakhet, where a project office has been established within the provincial DLF office, and 16 masons, 4 district officers and 3 PBPO officers have been trained (included in total above) and 8 demonstration biogas digesters have been built.
- The project has achieved significant media coverage in Laos, both in local and foreign language press, television and radio, which is helping to boost awareness.
- The project has received official requests from at least 2 additional provincial governments to expand the project to their area, as a clear sign of growing awareness and value of the project.

The MTR Team is of the opinion that the **physical target of 800 biogas digesters in 2008** will not be met, because:

- It takes still a disproportionate amount of time and energy to convince people to invest in a biogas digester. This is due to the lack of knowledge and confidence in the technology because an unknown technology is being promoted. This problem is common to all biogas programmes, but in the case of Laos is even more pertinent because the technology is totally new to the country, and people even do not believe that it can work. This implies that additional effort should be put in promotion.
- Frequent changes in project management, have affected the smooth implementation of the project, new staff has every time to be trained and takes time to begin understanding the issues.
- There have been also staff changes in the lead agency of the project (DLF).
- The monsoon is just begun and will make it impossible to build any new digesters up to the end of September, and there have been severe floods this year.
- Even though the expressions of interest are increasing, they are still not enough to achieve the target.
- The subsidy in 2007 was higher, and has been reduced in 2008.

According to the project management the target lays behind some 6 months. The monsoon period which is not suitable for construction, could be used for promotion,

were not, that this is the busiest time of the year for farmers, with rice planting. The best months for promotion are December and January which are cool and dry, but this will not help this years' target.

4.2.2 Awareness and Promotion

Awareness and promotion is being done using several instruments: TV, newspapers, printed materials, etc.

One of the most used mechanisms is that of village meetings to explain the benefits and costs of the technology, this is basically on a face-to-face level. At this level one really should talk about all benefits of the introduction of the biogas technology, and from direct observation of the MTR Team of one of these meetings it seems that this is done the right way. But, the outreach of this promotion is very limited.

The main vehicles for promotion have been the PBPOs established at the Provincial Agriculture and Forestry Office (PAFO), the staff of which has been trained in promotion and quality control. The staff of the PBPOs gets an incentive for each contract signed but this is not working as expected. One of the reasons is that the biogas project is not the only one existing and there are other projects offering higher benefits, there is competition among projects for the time of these officers. The system is also too static, the incentive should be larger but one can not increase too much the incentives for the officers as this is a direct cost for the project (and reduces the ownership of the project by the Government of Laos - GoL). Another aspect is that if the project really expands that these officers will not have enough time to deal with the multiple demands on their working hours. The solution is to find other avenues for promotion with larger motivation in acquiring customers, namely the masons, but this does not work well in the implementation setting chosen in Laos (see section 4.2.4).

The BPPO has a printed promotion folder available, but in our view the incorrect message is passed, there are for example three pictures (including the largest picture of the folder) on deforestation. In general people do not care much about this issue and certainly not if they have to invest their own money. Furthermore the largest picture is even not the right one because the kind of wood being cut is typically that for logging, not even the right size for charcoal making.

If people have to be convinced to invest in the biogas technology, then the promotion should focus on their benefits. Because apparently people still collect wood in most provinces, the benefit of saving wood and/or charcoal is not quite evident (even though user surveys indicate the contrary¹⁷). Therefore promotion should focus on the comfortable use (people indicate this as a great benefit), modern technology, clean cooking, house does not get dirty, health benefits, and the use of a potent fertiliser.

¹⁷ One should be careful with the extrapolation of the findings of the Biogas Users' Survey and taking conclusions based on it. The present users are by all standards rich households, and those tend to buy rather than to collect wood (and charcoal) because they have a higher opportunity benefit for their labour. Also most of the present demand for biogas digesters is located in the Vientiane Capital.

The posters used for the promotion of the biogas may need to be modified to have more illustrations. It will allow the local people to understand easily by watching pictures rather than reading the text, as rural people consist not only of Lao ethnic but also of other ethnics who can not speak fluently the Lao language. Up to now, the project worked in Vientiane Capital and Savannakhet province where most of people are Lao, but when the project will expand to other provinces in the north and south, the posters and brochure need to be modified. Project can gain from the experience of developing posters, brochures with the information centre and Master trainers of the National Agricultural and Forestry Extension Service (NAFES). They have long experiences in doing such extension materials.

The present exposure of the biogas project in national media such as TV is rather educative, explaining the benefits of the technology, and the effects on forests, etc. and as someone described it, boring. Using TV as a promotion tool should be based on attractive TV advertising of at the most 30 seconds where a clear message is passed to the public without too many explanations. The promotion film for national television of Bangladesh shows an excellent example of how it should be done (off course if adapted to account for the specific situation of Laos with its various ethnic and socio-economic groups).

A number of issues should be well developed before embarking in such a campaign, which relate to the danger of being too successful. One, how would the project deal with a large number of inquiries from all over the country and what will be the strategy to deal with requests from provinces which are not yet covered by the project? Another issue is, whether the project is physically able to deal with a large number of people asking for a biogas digester to be installed, this because the project has not yet enough masons trained for a large scale intervention (even though they are enough to meet the present low demand).

Word-of-mouth is the best promotion, but this only begins later on when there is already a critical number of biogas digesters installed in a certain area and people are satisfied with the services they provide (therefore quality is highly important).

Reasons for installation

The analysis of the results of the Biogas Users' Survey concerning the motivation of people to install biogas digesters, can be useful for fine-tuning the promotion materials. Out of a sample of 20 households (HH) the reasons for installing biogas digesters were:

1. Easy, comfortable and time saving source of energy (16 HH).
2. Economic benefits, saves money (14 HH).
3. Environmental benefits, saves forests, clean surrounding of the house (13 HH).
4. Subsidy (11 HH).
5. Motivation from service provider (7 HH).
6. Fertiliser of higher nutrient value (3 HH).
7. Health benefits (1 HH).

These results can be used to fine tune the promotion material. But one should be careful in interpreting the above results, because the above reasons might not be a reflection of

the potential future beneficiaries of biogas, but of the fact that these households have an above average economic situation. Time saving is certainly an argument that should be used in promotion, but time saving is only relevant if people have alternative use for time (for women this extra time is precious, it can be used to take care of children, education, rest, etc.). Economic benefits are also a reflection of the wealth of these households that are located close to Vientiane, where collection of fuels is more difficult, but this should not be taken as representative for the situation in Laos. That so many people mentioned environmental benefits is also a reflection of the higher education standards of these households, and probably of political correctness.

That so few households mentioned benefits of health and use of slurry is not a reflection that people do not find this important, but of the fact that these aspects have not been sufficiently promoted.

Sanitation

Even though –and very rightly– there is always a toilet pipe attached to the biogas digester, this is hardly been used due to cultural resistance. This asks also for some awareness material on this aspect, without ever forcing it on people. The advantages of connecting the toilet should be mentioned in promotion campaigns without being given too much emphasis, but only in the face-to-face actions, not in national campaigns.

4.2.3 Subsidy and Loans

At the beginning of the project an unsustainable amount of subsidy was provided (more than 50%). This is perfectly acceptable to kick-off the market, and the initial response was good. But the people who reacted were the very rich and rich farmers, and this is also typical, in the begin phases of the introduction of any technology, those are the people who can afford to take risks, the early adopters. But in 2008 the project wisely reduced the amount of subsidy to 43% for the smallest size, and at the same time increased the target, but in fact this means reaching an increasing number of households that are less rich. Here, the project is faced with a problem. The question is whether the subsidy level is enough to motivate people to invest.

Analysis of level of subsidy

The type of subsidy given is a flat-rate subsidy of € 100 which at the exchange rate of € 1 = Laos Kips (LAK) 13,600, is LAK 1.36 million. The table below gives a comparison of this value with the construction costs of the smallest biogas digester of 4 m³ (digester volume).

Table 4.1 – Subsidy and costs for a 4 m3 biogas digester (in 1,000 LAK).

Item	Subsidy	Costs (July 2008)
1. User components		
Construction materials		1,577
Skilled labour	(1) 800	800
Unskilled labour		540
Subtotal 1	800	2,917
2. BPPO components		
Accessories + Appliances	331	331
Warranty and Maintenance fund	200	200
Delivery fee	(2) 29	
Subtotal 2	560	531
3. Total costs	1,360	3,448

(1) This is cash subsidy to the user.

(2) Delivery fee is just a small (approx US\$3) transaction fee that is needed to physically transfer the cash payment to the customer, through the Lao Post system (they are the only institution with an office in every district in the country).

BPPO components are the in-kind contribution, with a value of LAK 560,000 (including reservation for warranty fund and delivery fee). Currently the BPPO buys most of the accessories because they must be sourced from Thailand or China with sufficient quality. However BPPO is actively encouraging local traders to stock these items. And actually one of the masons has already been importing small quantities of stoves from Thailand to supplement his income from building digesters.

The subsidy as given above is 39.4% of the total biogas digester cost for a 4 m3 biogas digester. The costs for a 6 m3 are LAK 3,970,000 and the subsidy is 34.3%, for an 8 m3, LAK 4,557,400 and 29.8% and for a 10 m3, LAK 5,174,800 and 26.3% respectively (July 2008 prices).

This level of support seems appropriate for a country where the technology is completely unknown, and this idea is reinforced by the financial analysis below. This conclusion still stands even though the cost of construction for a 4 m3 has increased 6.3% between February and July 2008.

Financial analysis

One of the main parameters in the financial analysis regarding biogas is the financial saving related to the use of wood, charcoal and eventually fossil fuel such as kerosene. All feasibility studies concerning biogas in Laos indicated that due to the large availability of wood (most people collect wood and spend not so much time in doing this) that it was difficult to convince people of these benefits.

However, the Users' Survey 2007 indicated that people were having real monetary savings with the introduction of biogas. As mentioned above these results might not be representative for the situation of Laos as they relate to wealthier households and around the capital where the pressure on wood resources is becoming visible. There is

an increasing deforestation due to logging, there is also an increasing substitution of natural forests and village forest/land where people used to collect wood, with managed forests of rubber, teak, eucalyptus and other commercial products, (where people are not allowed to collect wood). These trends will make the collection of wood increasingly difficult and people will spend more time collecting wood or in some cases will need to buy it. Therefore it seems appropriate in this financial calculation to assume a financial benefit for wood. The average savings indicated by the users' survey for the 4 m³ biogas digester was US\$ 88 per year. In this calculation we will assume around half of that value or in Euro around € 30 per year.

The investment cost of the 4 m³ digester is € 234, and the subsidy is € 100 (at the same exchange rate) or 43% of the digester costs. Further it is assumed an economic life span of 15 years, even though the digester can last for 30 years without major repairs. Further it is assumed very low savings in fertiliser of € 10 per year. Maintenance costs per year are assumed to be 2% of the investment cost.

With the above data the FIRR becomes 35% with subsidy and 15% without subsidy. The 15% is lower than the opportunity cost of capital in Laos and therefore is not attractive. The payback time is with subsidy 3.8 years and without subsidy 6.6 years. Conclusion is that the level of subsidy is appropriate for the smaller size of biogas digester. If one does not take the fertiliser savings in the calculation, the FIRR becomes 28% with subsidy and 8% without.

Choice of sizes vs. subsidy level

People should be given a choice of the size of the biogas digester¹⁸ if they can afford it and if the other criteria are met, i.e. availability of enough dung and enough demand for the biogas. The sizes of the biogas digesters built up to now are given in the table below.

Table 4.2 - Distribution of biogas digester sizes.

	4 m ³	6 m ³	8 m ³	10 m ³	Total
Vientiane	156	9	3	6	174
Savannakhet	11	0	0	0	11
Total	167	9	3	6	185
Percentage	90%	5%	2%	3%	

Therefore it can be seen that the majority of the biogas digesters constructed are of the smallest size. However, the feeding rates of the digesters are below the prescribed quantities, even though the majority of the people had enough dung to feed the digesters (from Users' Survey 2007). This might indicate that the biogas digesters are

¹⁸ People should also be given a choice of cookers (the present model is expensive). The feedback that the BPPO gets is that people like this expensive model, but again, the households that have adopted biogas are relatively rich ones. The fact that many buy a rice cooker also indicates that these households are better-off.

over-dimensioned for the needs of the families (reinforced by the fact that most users got enough gas to satisfy their needs), but most digesters are of the smallest size.

From the limited and not representative field visit of the MTR Team, it could be concluded that 3 out of 4 digesters were too large (they were 8 m³) for the energy needs of the families. Therefore even with this subsidy level people chose (or more likely were instructed) to install too large biogas digesters which in fact represents a capital investment which is not recoverable. The MTR Team is aware that the initial users are the well-off families, and that likely also prestige might have been a factor in the decision process.

However, the Users' Survey also indicates that a number of households were not satisfied with the size of their digester and would have installed bigger digesters if well informed. This indicates that the selection process of the digester size is not being done well and taking into account the real needs of the user.

Loans

The logic conclusion from the analysis above is that one should not increase the level of subsidy but on the other hand it is becoming increasingly difficult to motivate users to invest in a biogas digester. Learning from the experience in other countries one knows that a financing mechanism targeted for the biogas project should be in place, with a specific loan scheme for the biogas project. Existing loans have prohibitive interest rates (3 to 4% a month), and this will not work with an investment which people believe to be non-productive (even though it can be argued otherwise, see section 1.2).

If an average loan of € 100 is needed across all sizes of biogas digesters, and assuming that up to 2010 loans would be required for 5,000 biogas digesters (to relate it to the target), this means a capital amount of € 500,000 (US\$ 775,000) would be required for financing these loans. Existing MFIs will not be able to provide this level of financing and at a low interest rate unless they can get access to very cheap money (a loan at concessionary rates). However, the amount of loan financing required for the project is too small to be attractive to development financing organisations, due to the transaction costs involved for them. The MTR Team met with a very enthusiastic and well-managed MFI (the Ekphatthana Deposit-Taking MFI) that would be willing to extend these loans. One problem of this MFI and any other MFI existing in Laos is that they have limited national coverage.

Alternatively, the BPPO should look for a dedicated line of credit at the Agricultural Promotion Bank which has a large network of branches and/or with the Na Yo Bay Bank, which works only in some (poor) priority districts.

Under the ADB project for Num Ngum River Basin Protection, ADB gives loans to village committees for protection of the environment, and the biogas project could tap into this source of funds. This project is under the MAF to promote sustainable agricultural activities on the preservation of the environment. This project is only for Vientiane and Xiengkhuang provinces.

4.2.4 Implementation model

National level

DLF is the main implementing partner of the Biogas project, and has formed a BPP, with a Project Advisor (part time), directed by a Project Director (part time) and having a Project Advisor (full time), people who are part of the DLF. The work of this office is overseen by a Steering Committee and supported by a team of 2 SNV advisors. The implementation consisting of promotion and quality control is done at the level of the PAFO and District Agriculture and Forestry Office (DAFO). The masons are the last link between the project and the users and in this implementation model have a very modest role. This organisation model while logical in the Laos context does not necessarily ensure a high level of implementation efficiency.

First, there is only one person of DLF working full time on the project, all others have biogas as an addition to their regular jobs at the DLF. Therefore, biogas is not a priority, it can suffer from competing demands on the time of a person. The people involved are given some financial incentives to be more pro-active, but this might (and the MTR Team was informed that there is donor project competition for the time of these officials) not be enough compared to the incentives other programmes are offering. On the other hand increase incentives gives the wrong signal to the involved people, increases project costs and reduces ownership of the project by the GoL. The incentives are in itself not the real problem, the real problem is that the number of biogas digesters being built is very small and there is no economy of scale, the officials have to put a disproportionate amount of time to get few contracts signed. This calls for alternative ways of approaching the potential customers.

Staff retention issues

The delays in achieving the targets can also be in part attributed to the many changes in staff that have occurred. This consequently leads to new people that need time to get acquainted with the project and to get training in specific aspects of their job. At the level of DLF the project manager left December 2007 and the new project manager started his job only in March 2008.

BPP has also experienced some staff changes. Apparently the contracts between BPP and people are too open, staff can rescind unilaterally the contracts without restrictions, and therefore people can easily leave after they have acquired a certain number of skills. But, the MTR Team also got the message that the working environment needs more attention because the project is new, targets and job are challenging, and people do not feel comfortable if targets are not met.

Expansion

The project is trying to expand into two more provinces. This makes sense, especially because one of them is experiencing already problems with the supply of wood (Xiengkhuang). One should be careful with these extension plans not to create too early a very heavy infrastructure with the associate disproportionate project costs related to the number of digesters build.

Provincial and District Agricultural and Forestry staff

The biogas project at the provincial level is implemented by the DLF. There is one office in each province which consists of Provincial Project Director, Project Coordinator, 1 biogas technical staff, 1 promotion staff and accountant. The project allocates budget for buying the office equipment and each month for the operational costs. Each staff is supposed to work at least 50% of their working time to the activity of the project as mentioned in the project MoU.

Biogas development is however, not their priority, they may need to review their role in the development of the biogas project in their province. It means they will not need to do all tasks themselves in the future, especially the commercial component such as finding the customers. They may need to delegate these functions to the private sector in the province. Their role should be technical support, quality control, regulation and coordination in order to allow all concerned parties to develop this project smoothly.

Concerning the district staff that plays the role in controlling the quality of construction of biogas digesters and finding the customers, the MTR Team observed that they are motivated and understand well the technique of construction of the biogas digesters. The remuneration that they have from the project for their work up to now is reasonable for them to continue to work.

4.2.5 Training issues

Training manual, quality control forms and instruction manuals

The project has developed the following documents for training the masons, provincial and district agricultural staff and quality control:

- Construction Manual of Biogas digester.
- Survey form for acquiring potential biogas digester users.
- Quality control forms for district staff.
- Instruction Manual for use and maintenance of the biogas digester.

Training tasks

At the beginning of the project activity, the trainings on construction of biogas digesters to masons, provincial and district agricultural staff were assigned to the Engineering and Renewable Energy Centre of the National Authority for Science and Technology (NAST) as the project intended to set up sustainable training systems for the biogas sector in Lao PDR. Soon after, as the staff of this centre was not available to provide the regular training sessions, the project's staff organised the training by themselves. One training session could receive 20-30 persons, so far 4 training sessions were conducted since 2007.

The project is presently cooperating with the Technology Research Institute of NAST to provide mason training at the premises of the institute near Vientiane. This has the advantage that one can control the quality of training and keep high standards of training.

Users' training

After the construction of the biogas digester, the mason will train the customers on how to use the biogas digester and equipment. According to the User' Survey 2007¹⁹, 75% of the users were not feeding their digester according to the required quantities even though they had the required quantities of dung. This indicates either that the user gets enough gas to cook even with underfeeding, or that the user is not properly trained in the operation of the digesters. Actually users are complaining often about the training they receive, which is of the responsibility of the masons. The study also concluded that the majority of the users lacked knowledge on the several operational activities needed to be performed to keep the digester operating well.

The MTR Team did not have enough evidence to conclude that there was a gender issue related to the training of the users (all masons are men and all users are women), which could be the one of the reasons for the inadequate users' training.

Mason's training

The basic qualification of a person selected to be trained as a mason is to have background in construction works. In reality the masons have different backgrounds, some of them have no knowledge in construction at all or never worked in the field of construction. It creates difficulties in the training process as the knowledge of the trainees is not the same. The province and district staff selects the people often based on non-permanent employment record, but this may affect to the quality of training and then of the construction.

Until now, the livestock and fishery staff at the provincial and district level and the biogas project are responsible to look for the customers, even though, recently some of masons began to find the customers by themselves. In our opinion, to encourage the masons to play the role of entrepreneurs or form a small business company will be the best way to develop the project. To support this idea, the masons need to be trained in business management such as how to find the customers, how to deal with purchasing and selling materials and appliances, to provide after sales service, how to get access to credit, etc.

4.2.6 Slurry Extension organisation

Slurry Extension training

One of the larger potential benefits of the biogas digester is the use of slurry, a potent fertiliser. Farmers use the slurry for growing their crops by their own initiative, mostly for vegetable gardens, however they have not been trained on how to use it effectively for crop production.

Slurry extension training should not be given by the masons, who obviously will not do it unless there are strong financial incentives. But, besides that, slurry extension is specialised work that needs to be carefully implemented.

¹⁹ Many findings in this review are partly based on the conclusions from that survey. This is obviously not without risk, due to the relative short period analysed of the experience with biogas.

The team met with people from PROFIL which is involved in organic farming. BPPO should seek cooperation with this organisation, in exploring an alternative avenue for the slurry extension services, and also to work out ways of marketing dried slurry, as some users do not have a use for it. PROFIL also has its own source of funds and can draw funds from the Lao Extension Approach Project which is financed with Swiss Development Cooperation funds.

Slurry extension materials

In a number of countries there is an overwhelming body of evidence of the beneficial impacts of slurry on a multitude of crops. This material should be adapted and translated into Lao. Research on the use of slurry should only be done when there is an overwhelming indication that the practices in Laos are really different from other countries for a particular crop. Differences in soil composition and the use of slurry have also been researched in for example Bangladesh and could be adapted to the soils of Laos. One has to be practical and objective oriented, one does not need to know with scientific precision the quantities required for a certain soil and a certain crop, because a margin of plus or minus 10% will not have noticeable effects, taking into account other variables that are always influencing the growth of plants.

Organisation of the Slurry Extension

Since the VIII Party congress, the MAF has restructured its organisation structure from the central level to district level. Technical departments such as Agriculture, Livestock and Fishery are responsible for the regulation and measures concerning crop and animal production while the National Agricultural and Forestry Technical Research Institute (NAFRI) is responsible for all the research in the Agricultural and Forestry sector and the NAFES is responsible for the extension of all the technology to farmers. Technical departments, the NAFRI and the NAFES, are vertically organised at the province and district level:

- The NAFRI has its centres in the three regions of Laos: Northern, Central and Southern Agricultural and Forestry Technical Research Centre.
- The NAFES does not have a centre in every province, but it has the Technical Agricultural and Forestry Service Centres in all districts of Lao PDR and also in cluster villages due to its role to promote the new techniques and technologies to grass root people and farmers.

In order to promote the use of slurry for crop production, all partners need to work together, as given in the recommendations.

4.2.7 Organise Masons into small businesses

In the actual institutional set-up masons are expected to be passive entities that are waiting for work that is indicated to them by the PAFOs/DAFOs. But this situation will not lead to the creation of a market-oriented environment for the construction of biogas digesters, which is one of the objectives of the project. Masons should obviously be involved in promotion and in trying to get new customers (some masons are actually

already doing this but this is not stimulated and therefore depends very much on personal initiative).

However, the above scheme is still too static and will not lead to a large number of installations being built. Another possible solution is to help masons organise themselves in business units, eventually with someone putting more capital than others, and effectively working as the construction manager. A firm can also be started simply by putting together the will of a number of people and formalising it in a registered firm without capital. This has the advantage that the masons will try to get as much work as possible to keep everyone busy. The firm can have a larger margin of profit by economies of scale (building larger number of digesters reduces overhead costs, reduces transportation costs, reduces amount of "dead" time that specialised masons are waiting for cement to dry, etc.).

Evidently that without any capital investment at the beginning it will take time before some scale benefits will materialise. With capital a firm could for example buy materials in bulk for lower price, for example for a month supply to build 30 biogas digesters (but this requires a large amount of capital that they do not have at the moment), and these materials are passed to the user at a profit. They could offer a turn-key price that could be lower than the price of the installation stipulated by the BPPO and still make a higher profit than building the installations individually. Evidently that borrowing money might be out of question, and if there is no initial capital, it will take time for the firm to capitalise.

The opportunity is already being explored by the BPPO to involved established and capitalised firms that work in energy supply in rural areas. Problem is that it is difficult to convince these companies in getting involved, because they can have a larger profit with for example installing solar photovoltaic (PV) panels. Because biogas technology involves a large degree of local craftsmanship to build quality digesters and the maintenance, user training, etc, is more complicated than with for example PV, it will be very difficult to convince any established company to participate.

Another argument that works against biogas technology, is that when built, you can not repossess it, unlike PV. But, on the other hand PV panels can be stolen (either for real or faked) and also in this case the company incurs in a financial risk. It might be useful to explore a franchising system for a well defined area, where a company gets the franchise for that area. Further the company should get all incentives that are now given to other partners, including promotion materials and reimbursement of costs for local promotion. This scheme will only be attractive if the company can buy materials in bulk and offer a turn-key biogas digester for the price fixed by the BPPO and the subsidy is channelled through the company. The user can reduce its costs by contributing with labour for well defined tasks.

Both in the case of organised masons as in the case of franchising one has the problem of operating costs. This can be dealt with, by fixing a monthly target for the company to achieve, and depositing in a bank account the value of the subsidy and of all incentives which are output related at the beginning of every month. This system can be evaluated

and adapted if it works well. In this case, one could begin disbursing the amounts related to the next 3 months target.

A related problem that could also be addressed if a company is building a larger number of installations, is the problem of working during the monsoon period. If the ground water table allows for this, a large number of pits of the digester could be excavated at the end of the dry season, and covered with a make-shift tent built with bamboo poles and agricultural plastic, with the removed earth walling the pit (see section 1.2). This would also very much improve the situation related to the retention of masons that find themselves without an income during the monsoon.

4.2.8 Quality Control

The organisation of the quality control is well devised, with a first level of control by the mason itself (masons control quality of materials bought by the user, as they are interested in delivering quality). Then district officers of the DLF control the digesters under construction and upon completion. Technical officers of the BPPO visit also digesters under construction and completed based on a random sample. This is meant to be a second level control, also on the accuracy of reporting by the district officers.

However, the system of enforcement is not yet well advanced. There are reasons for at an early stage not to frighten the partners with very strict enforcement measures, but as the project gains momentum enforcement of quality standards should be strict. Masons can be penalised for default construction, but this is still a difficult point to implement, also because they are working as individuals. Also, there are no penalties agreed to be imposed on a provincial or district officer that does not do his/her job well and consequently reports wrong information (either unconsciously or premeditatedly). Besides, BPPO officers find it difficult to impose penalties on the provincial and district officers but this should change in the future. Currently BPP has chosen to use a system of positive reward incentives. BPP also plans to introduce a licensing and accreditation scheme that will require masons and DAFO to meet minimum standards and ongoing assessment.

Maintenance

Maintenance is provided for 2 years and in those 2 years masons have to visit the digesters 3 times, and whenever they are called. The BPPO control this maintenance provision by levying a Warranty Fee of LAK 200,000 per biogas plant which is held in trust by BPP. The mason will receive this amount 2 years after construction if the system is still working and if the customer has a record of the mason having visited at least 3 times.

Accessories

The BPPO is encouraging local companies to start producing some of the components that are currently imported from Thailand or China. One should be careful to analyse whether the project size justifies such production. It was also observed that the installed biogas stoves were of an expensive model, and the fact that the users were asking even for fancier models only reflects the status of the present users. One should look at the

local production of cheaper models like the ones used in other countries, which consist of a welded frame and a good quality burner.

4.2.9 Final remarks

The overall conclusion is that the project is performing satisfactorily, despite the challenges faced. However, to introduce more dynamism into the project new implementation forms should be addressed as the existing avenue through government agencies is too static and lacks dynamism.

4.3 Recommendations

Targets

Like analysed in the findings section, the project suffers from a delay in achieving its targets. Therefore it is recommended to adapt the targets to a more realistic level, say 400 biogas digesters in 2008 and adapt it sequentially for next years. As a consequence of the larger than expect time needed to have the project rolling SNV should consider extending the project for one to two years. This could be done budget neutral concerning the subsidies, but this will have implications for project costs. Also this will further increase the project costs per installed biogas digester, and consequently decrease the management efficiency of the project.

Promotion

The project folder should be adapted to better reflect the benefits to the user of the adoption of biogas: comfortable and easy use as opposed to wood or charcoal burning, clean cooking, house does not get dirty, health benefits, the possible use of a potent fertiliser, in summary all benefits of a modern technology. Also the financial benefits of the use of slurry, of avoided medical costs and of increased capacity to live and work well should be emphasised.

The poster used for biogas promotion should be adapted to have more pictures and less text. The project can gain from the experience of the information centre and Master trainers of the NAFES.

Also related to promotion and if the project wants to create awareness on a larger scale then one should start a national campaign on television. This would be a spot of say 30 seconds every day during one month and after that less frequently. A shiny, modern, appealing image of biogas should be given, no boring educational or moral messages, stressing the ease of use, cleanness and health aspects, therefore a modern technology. It is recommended to look into existing examples of how this has been done in other countries, such as Bangladesh. This project should also advertise the number of a national help desk telephone to be created at the BPPO, where people can obtain information about the project, but also log complains in case service is not provided. This would greatly increase the confidence of people in the project. This communication

strategy should be also well designed and the project should be ready to accommodate a large diversity of requests and expectations, in order not to disappoint people.

Subsidy

Even though this would very much boost the implementation rate of the project it is recommended not to increase the level of subsidy. However, the escalation of costs should be every year analysed and if the escalation of costs make the subsidy percentage much lower, the subsidy should be revised to keep the same percentage as at the present. The flat rate subsidy should be kept as such, and one should not increase the subsidies according to size, because this gives the wrong signal to the user.

Credit

It is recommended that a specific line of credit is created for biogas loans or that the GoL instructs a number of development banks to extend existing lines of credit for biogas loans. This line of credit can be a very large incentive for people to invest in a biogas digester, and certainly enlarges the customer base of people that could afford the investment. For this to happen it is recommended that the line ministry where the BPPO is embedded, the MAF, should through the normal communication lines of the GoL approach the Ministry of Finance and explain the national importance of the biogas project and how it fits in the national development policy and request that a line of credit be established in the amount of € 500,000 for the next 2 ½ years with a preferential interest rate and a loan term of one year and ideally of two years.

Institutional and management issues

The BPPO as it stands now appears to function based on a large amount of goodwill of the implementation partners. This should not be the case and there should be an intrinsic motivation for the project, i.e. that the project is good for the Laotian people and good for the economy and country. Therefore it is recommended that the GoL clearly states the national importance of the project and gives clear directives to DLF to consider the project as part of their tasks.

It is recommended that SNV organises a brain storming session with all staff to look into motivation issues and contractual arrangements, and consequently changes the contractual arrangements to be more binding, so that staff can only leave after for example a certain period or in mutual agreement.

The strategy to expand into two new provinces is good as these provinces seem to have a large potential for the introduction of biogas digesters. However, it is recommended not to set up a too heavy project organisation as this will make the project costlier and less efficient. Related to the existing dependence of the project on one implementation partner one should look in these new provinces for strategic partnership with relevant organisations in order to leverage their existing rural networks, relationships, data, promotion mechanisms, etc., to help BPPO access more potential customers.

Training aspects

Because it has been observed that a large number of installations are underfed, and also that some installations are too big for the energy needs of the families, it is

recommended that the masons and the staff of the PBPO and district staff get better training in selecting the appropriate size of the digester.

It was also observed that the users are not properly trained in the use and maintenance of the digester. It is therefore recommended that better training is provided to the masons in this respect. Also, there should be better control mechanisms to assess if users are properly trained before paying the mason, to strengthen enforcement. Also it is recommended to look if there is a problem with gender sensitivity of users' training.

Related to the masons training and to their selection criteria one should be stricter in their selection. Before issuing certificates to the masons, it is recommended that the project makes a rigorous evaluation of their capacities eventually based on the track record of their work of the first 1 or 2 months.

Concerning the slurry extension training this should be seen as an integral and essential part of the project. Therefore it is recommended that the DoA staff at district level be involved, and that criteria are written for selecting officials, and provisions for training of these officials are taken. In order not to depend only on government organisations, the synergies of the BPP with the programmes implemented by PROFIL should be considered, and in certain provinces/districts the slurry extension should be given to PROFIL. This also allows the BPPO to compare the costs and results of both modes of implementation. It is also recommended to continue working with PROFIL in exploring the possibilities for packaging the slurry to be sold as bio-fertiliser.

For many activities indicated above, but especially in the case of slurry extension, many could be learned from programmes in other countries, which are more advanced in the subject, such as Bangladesh, and fully explore the networking possibilities and synergies that the ABP offers. For example it is recommended to translate into Lao language some advanced slurry literature from that country and adapt it to the local situation.

The MTR Team recommends that the project revises the amount of masons who are planned to be trained (the present target is to train an additional 100 masons this year) in order to reflect the present needs of the project.

Slurry extension

The organisation of the slurry extension could look like this:

Department of Livestock and Fishery

As the project owner, the DLF and the biogas project will be in charge of the coordinating with other partners in order to extend the uses of slurry in crop production. First of all, the Department will contact with the NAFRI for testing the slurry uses in crop production.

NAFRI

The NAFRI is in charge of testing the slurry in crop production, for example, vegetable production, rice production etc. The results will be reported to the DLF and the Scientific Council of the MAF for the acknowledgement of the scientific value of slurry

for agriculture production. The NAFRI inform the NAFES about the result of testing of slurry uses through joint meetings with the support of Biogas project (however, see remark above about the existence of good material on the subject that can be adapted easily).

Department of Agriculture

When the Scientific Council accepts the value of slurry for crop production, the DoA will register and issue a certificate for the use of the slurry to the DLF. The NAFES will develop the extension through training of Provincial Agricultural and Forestry technical Service Centre staff or alternatively the District Agricultural and Forestry Technical Service Centre staff. Then province or district staff can provide training to Village Extension workers and farmers. Demonstration plots can be developed in a cluster village technical service centre. The Village Extension Workers demonstrate the use of slurry in crop production to farmers at the village level and they can be the coordinator between the farmers and District Extension workers in case of training needs or problems encountered by the farmers in using the slurry.

Organising masons

It is strongly recommended to explore and promote the possibility of masons merging into small private companies. For this to happen, training in promotion, basic business skills, simple bookkeeping, etc. are required. Also for this to work these firms should be allowed to sell the installations on a turn-key basis for the prices agreed by the BPPO, with any larger profits from reduced overhead costs to be accrued by them.

The project is already exploring some avenues of cooperation with the private sector. It is recommended to pursue this more strongly, and test a concept for franchising the operations in a selected district with good potential and enabling conditions to an existing construction firm or an energy service delivery company.

Because when the project grows and a larger number of installations is going to be built, the masons and companies will be limited by the amount of working capital they have available. In order to address this problem it is recommended that the working capital, be provided at the beginning of every month, which is related to the amount of installations to be built in that month. This advance payment would be related to the amount of materials to be purchased, not labour.

Other recommendations

There are several solutions for extending the period when one can build biogas digesters into the rainy season. The project should look creatively at this, and find simple and cheap solutions for this problem (see section 1.2).

It is recommended that the BPPO looks into the import or local production of cheaper stove models. In any case people should be given a choice between not expensive and fancy looking models, which come at a cost.

In order to have a better understanding of the performance of the several players related to quality control a database should be created at the BPPO so that one can automatically see which masons have high default rates, which district officers are not

controlling well, etc. This information should be regularly fed back to the partners, and masons be penalised and as a last recourse taken out of the project. For provincial and district officers, they should first be warned, then their benefits eliminated in the same proportion as the default samples, and finally if still not performing be removed from the project partnership.

It is recommended to create a National help desk at BPPO with a phone number for complains, phone number that is given to the users in a plasticised or self-adhesive form.

References

- [1] BPP Implementation Plan, October 2006
- [2] Assignment Agreement DLF-SNV, January 2008.
- [3] Vision of the Lo Biogas Pilot Project, Wim van Nes, November 2007.
- [4] Biogas Pilot Project Lao PDR, Annual Plan and Budget, January 2008.
- [5] Biogas Users' Survey - 2007, Prakash C. Ghimire, February 2007.
- [6] Forestry Sector Development Report for 2006/07, MAF, November 2007.
- [7] National Growth and Poverty Eradication Strategy, Vientiane, CPC (GoL), 2004.
- [8] The Government's Strategic Vision for Agricultural Sector, MAF, Vientiane. 1999.
- [9] Forestry Strategy to Year 2020, MAF, Vientiane, 2003
- [10] Forestry Law, MAF and Ministry of Justice, 2008.
- [11] Framework of strategic vision on forest resources management to the year 2020, MAF, Vientiane, 2000.

List of Persons Met

No.	Name	Position
1.	Mr. N. Phanaphet	Deputy Chief, Livestock Management Centre, Department of Livestock and Fisheries, Ministry of Agriculture and Fisheries
2.	Mr. C. Surimanothan	BPP Advisor, Livestock Management Centre, Department of Livestock and Fisheries, Ministry of Agriculture and Fisheries
3.	Mr. A. Williamson	Renewable Energy Sector Leader, SNV Laos
4.	Mr. T. Santhasith	Programme Manager, BPP
5.	Mr. P. Wakayxiong	Technical Officer, BPP
6.	Mr. S. Nampanya	Training & Promotion Officer
7.	Mr. P. Xaysombath	Deputy Director, National Authority for Science and Technology
8.	Mr. S. Vannapho	Director General, Engineering and Renewable Energy centre, National Authority for Science and Technology
9.	Mr. O. Phommechat	Project Coordinator, PABO, VTN Capital
10.	Mr. K. Manivong	Promotion Officer, PABO, VTN Capital
11.	Mr. B. Phiasaka	Technical Officer, PABO, VTN Capital
12.	Ms. S. Oongbouppha	Administration & Finance Officer, PABO, VTN Capital
13.	Mr. S. Sisenglath	Director, Micro-Financing Institution
14.	Mr. T. Ledecq	Team leader, Greater Mekong Project, WWF Laos
15.	Mr. A. Wilson	Marketing Advisor, PROFIL
16.	Mr. A. Schroeter	Director, SUNLABOB
17.		
18.		
19.		

This page was intentionally left blank



Biogas Programme for the Animal Husbandry Sector Vietnam

Prepared by:
Júlio de Castro
Nguyen Huong Thuy Phan

Acronyms and Abbreviations (country-specific)

AEC	Agricultural Extension Centre
AITCV	Asian Institute of Technology Centre in Vietnam
BPII	Biogas Programme for the Animal Husbandry Sector in Vietnam, Phase II
BPD	Biogas Project Division
DARD	Department of Agriculture and Rural Development
GoV	Government of Vietnam
LPD	Livestock Production Department
MARD	Ministry of Agriculture and Rural Development in Vietnam
PBPD	Provincial Biogas Project Division
NSC	National Steering Committee
VBARD	Vietnam Bank for Agriculture and Rural Development
VND	Vietnamese Dong

Exchange rates used in this report

€ 1 = VND 25,000

€ 1 = US\$ 1.5

Chapter V – Biogas Programme for the Animal Husbandry Sector Vietnam

5.1 Introduction

The Vietnamese and Netherlands Governments signed a MoU for the implementation of a household biogas dissemination programme in 10 provinces of Vietnam in January 2003. The “Support Project to the Biogas Programme for the Agricultural Sector in some Provinces in Vietnam” or “BP I”- uniquely joined Vietnam’s technical knowledge on fixed dome digester design and construction with Netherlands’ experience with large-scale dissemination of household biogas. The DGIS financially supported the programme with a grant of -initially- US\$ 2 million. BP I was intended to close in January 2006. The total number of biogas digesters of 18,000 (initially 12,000) was completed as programmed. The BPI was extended throughout 2006 in what is known as an “interim phase” while waiting for the conclusion of the negotiations to start Phase II. This interim phase started late (May 2006) and the construction target was 9,550 biogas digesters, of which 8,777 were completed a remarkable achievement, if one takes the short implementation time into account.

On 6 July 2007 the Ministry of Agriculture and Rural Development in Vietnam (MARD), DGIS and SNV signed a MoU to support the second phase of the biogas programme (BPII). The programme proposal budget consisted of € 16.8 million, out of which DGIS committed roughly 22%, the provinces committed 21%, an according to the MoU the remaining balance would be brought up by MARD via a KfW loan taken by the MARD and possibly paid back via CDM. Other possibility was that MARD would contribute via other financial sources to support the BPII. In August 2007 the decision of the Government Office was made not to take the KfW loan but to seek other financial sources. The (larger) provincial contributions have been instrumental to keep the programme on track, however this only accounts for another 30%, still leaving a serious financing gap that has to be filled in the remaining of 2008.

Conformity with national development strategies

According to the Government of Vietnam (GoV) the biogas programme contributes to several of its national strategies:

- National Strategy for environment protection.
- Resolution No. 41-NQ/TW of the Political Bureau on the environment protection issue in the period of industrialisation and modernisation.
- Comprehensive Poverty Reduction and Growth Strategy.
- Sustainable Development Stagey (Vietnam Agenda 21) for harmonisation of economic, social and environmental development.
- National Energy Policy to develop renewable energy substituting for coal and fuelwood and to protect forest resources.
- Livestock Production Development Strategy.

The Vietnamese government supports a significant growth of the livestock sector. Vietnam's high population density means that a considerable amount of this growth will be in semi-urban areas (e.g. within the limits of rural villages). This is likely to have public and animal health implications due to increased smell, and surface and groundwater pollution.

5.2 Findings

The BPII started its activities in 2007 supported by a national Biogas Project Office located in Hanoi. This programme office has been recently renamed into Biogas Project Division (BPD), because organically it became part of the structure of the Livestock Production Department (LPD) of the MARD.

5.2.1 Achievements

The achievements of the programme should be seen against the main features of the BPII:

- **Building on past successes and lessons.** This has been followed by the programme.
- **Creating a commercially viable sector.** Not yet, see also discussion in section 1.2.
- **Jump-starting provinces.** Is being achieved.
- **Maximisation of biogas benefits.** The programme is working slowly, but steadily towards this goal.
- **Institutionalising biogas.** The biogas programme is now fully embedded in the MARD, it is now a division within the LPD. Related to biogas being part of the GoV policies, this still is not achieved, even though biogas is mentioned in several documents, such as those of environmental policies, there is a decree that mentions biogas as one of the accepted methods to deal with the waste caused by pig production, and biogas is also mentioned in the national target program for sanitation and hygiene.
- **Innovative financial mechanisms.** Of the four sub-components of this bullet, credit products for biogas users has still not been achieved, and also obtaining CDM credits for the programme (not entirely to be attributed to the BPII but to limitations and lack of definition of CDM methodologies related to biogas digesters). However, the programme succeeded in selling a small quantity of credits to compensate for the GHG emissions of a Dutch rock band. The other two (subsidies and provincial contributions) will be analysed below.

The specific objectives of the BPII are:

1. Continue the programme operations in 24 provinces and start in another 34 to build a total of 140,000 biogas digesters.
2. Provide training for at least 1 biogas technician per district and two biogas masons teams per district, and support to establish 1-2 biogas enterprises and a biogas programme office per province.

3. Provide 3 training courses for all biogas users (pre and post construction training and extension).
4. Contribute to reduce environmental pollution due to animal husbandry development and improve sanitation of the farms.
5. Reduce the time spent on firewood collection, cooking and cleaning.
6. Reduce GHG emissions with about 420,000 tons CO₂-eq per year and produce good fertiliser for cropping and food for animals.
7. Substitute yearly about 200,000 tons of fuelwood or agricultural wastes.
8. Create at least 2,500 jobs for biogas construction and services in rural areas.

From 2006 until 2008 the biogas programme has continued to build its implementation strategy and activities on the experiences of the previous phase. If one compares the above objectives with the achievements the following can be said (for some items there is still too little data available or it is too early to assess the progress).

Bullet 1, 2, 3 and 6 will be analysed below. Bullet 4 has been clearly met as the introduction of biogas has solved many problems like dumping of pig dung in rivers and lagoons, and the persistent bad smell that led many neighbours to file complaints against livestock farmers, while the sanitation at farm sites has improved dramatically. Some farmers due to the introduction of the digester even were able to increase the number of animals. Bullets 5 and 7 are a natural feature of all biogas programmes.

All mason team leaders and technicians have been trained, and often have been to refresher training.

Concerning bullet 8 it is estimated that the programme already facilitates employment for between 1,700 and 2,200 masons, even though they do not all work full-time with biogas, especially in the wet season when their possibilities for construction are reduced. At provincial and district level the programme also provides additional benefits for government employees. On average BP II generates 10 workdays per digester, meaning that in 2007 and in the beginning months of 2008 BP II created some 200,000 workdays (total of BP II 1.4 million workdays).

5.2.2 Target and jump-starting of provinces

The programme expansion and number of digesters to be built is given in the table below.

Table 5.1 - Targets and number of provinces.

Year	2007	2008	2009	2010	2011	Total
Target (no. of digesters)	16,000	15,000	26,000	36,000	47,000	140,000
Provinces (estimated no.)	25	32	45	50	55	55
Target achievement (1) (2)	14,380	12,000				
Provinces achievement (1)(2)(3)	25	28				

(1) Up to August 2008.

- (2) Numbers based on information from BPD.
- (3) BPII is only planning to add 5 provinces in 2008, according to Annual Plan 2008.

Observation: The BPD is already in its planning implying that BPII will be extended into 2011. However, the original plan for BPII according to the MoU signed by the GoV, SNV and GoN was that the BPII would run from 2007 to 2010.

Related to the expansion to new provinces, the begin situation of the BPII was that at the end of 2006, 20 provinces were actively participating in the biogas programme. In 2007, 5 new provinces joined and in 2008 up to the beginning of August, 3 new provinces.

Also at the end of the interim phase of the BP, there was a total effective of 24,396 digesters built and subsidy paid. Because, 2,403 digesters were built in 2006 but subsidy was not paid these installations do not count towards the target of 2006 and are a "carry-over" to 2007 (see discussion below).

The lower target achievement for 2007 is not related to lack of demand but to the fact that in that year the provinces were not allowed to start construction before the provincial contribution to the programme was transferred to the BPD, and the provinces only effectively begun construction at the end of May and begin of rainy season. As a consequence of this the provinces became more cautious and indicated to 2008 lower targets, so that they would be sure to meet those targets.

However, in 2008 the BPD wisely has allowed the provinces to go ahead constructing before the financial contribution was transferred, because this contribution is budgeted but bureaucratic and approval procedures delay its transfer. As a consequence at the beginning of August 2008, approximately 80% of this years' target has already been achieved.

Therefore, is the programme meeting its targets or not? Well the programme will not meet its targets as originally planned in 4 years. Meeting the targets in the now planned 5 years is very likely, but it depends more on the availability of provincial contribution to cover the costs of subsidy needed to meet those targets, because there is enough demand. In one of the provinces (Hai Duong) visited by the MTR Team, they had already by August completed 532 biogas digesters of their target for 2008 of 869. Information received from the province of Thanh Hoa indicates that of the 2008 target of 900 biogas digesters that 830 have been completed already by mid-August. Anyway the programme is likely to achieve its (decreased) target for 2008, but it will require a lot of additional effort to recover the small backlog from last years and meet the ever increasing numbers.

Acceptance reports

Related to the target analysis, there is an issue that is hampering the correct functioning of the BPD and is also having consequences for the users. Every completed biogas digester needs to be controlled by a district technician (sometimes provincial technicians also do this) and the form signed by him/her and the owner. But considerable delays occur in effectively doing this and sending the forms to the BPD.

For example by August 2008, like mentioned above, 80% of the digesters were completed, but only 20% acceptance reports had been received by the BPD of which they only were able to process 50% of it (10% of total), because they were received in July and August. But, most acceptance reports are received in November and December. This means that the BDP has to process a large amount of data at one time and this is not effective for the administration people. Also national quality control (QC) on QC can only be done after the acceptance reports have been received, and this makes an efficient planning of the use of human resources very difficult.

Because the BPD only can transfer the subsidy after obtaining these forms and doing a number of checks and balances to guarantee correct disbursement (for example, sometimes the BPD officers phone the household to cross-check information), this means that some users have to wait for 6 to 7 months or more to receive the subsidy. There have been frequent complains about this situation in Users' Surveys. Therefore the delay in paying the subsidy is caused by this problem and not by delays in the Postal Service banking services, as some people are suggesting as a reason to change this transfer of payment method.

Another consequence of the late arrival of the acceptance reports is that a biogas digester only counts for that year's target, if the digesters are completed and the subsidy is paid. Because the later can not be achieved before closing books, there is an enormous "carry-over" of biogas digesters to next year with all the budgetary problems of that.

Several reasons were given for this late delivery of the acceptance reports:

- The district technicians are very busy with other tasks.
- The district technicians wait until they have sufficient number of digesters to control before doing this.
- The acceptance report can only be filled after the digester has been completely loaded with dung and water.
- In some cases the users refuse to sign the acceptance reports a number of months until they are sure that the digesters work satisfactorily.

Related to the above reasons the following: very little can be done about the first bullet, but little time can be a question of priorities especially when one knows that the technicians get a nice incentive to do this job. The second bullet also relates to the first and can be the symptom of something else (see section 5.2.10). The third bullet is related to a practice that is not common in other biogas programmes, in other countries the acceptance or completion report is filled with the digester still empty, so that the quality of construction and the measurements of the digester can be controlled, something one can not do when the digester is filled (for example how can one control the volume of the digester?). The fourth problem is solved the moment that the biogas technician does the acceptance because the user will not refuse to sign (one can also explain that the subsidy will take then up to one year to be processed). Any dispute between the user and the mason about the quality of the biogas digester could be institutionalised by having a clause that the mason gets paid a certain amount (for example 10% of his labour) after 6 months, and this acts also as a kind of warranty.

As a solution for this problem the BPD in cooperation with the Provincial Biogas Programme Divisions (PBPD) should set besides yearly, also monthly targets to be achieved²⁰. Further the acceptance reports should be due every month at the latest one month later than completion. Evidently that, rules without enforcement do not mean anything, therefore there should be some kind of “penalty” for non-compliance. If one couples the transfer of the incentives to the provinces and to the districts to timely receiving the acceptance reports, than people have a “financial” motivation to send the reports on time. If this does not work administrative warnings have to be issued by the MARD to the concerned officials.

5.2.3 Financial problems

The total cost of the programme and the sources of finance (in million Euro) as agreed in the MoU is the following:

Beneficiaries' contribution:	28
Development loan:	9.6
Provinces:	3.5
ODA:	3.7 (3.1 GoN and 0.6 SNV)
Total:	44.8

The total average investment for a typical biogas digester amounts to € 250 (VND 6.25 million). The subsidy is € 40 (VND 1 million), of which € 25 comes from the provinces and € 15 from ODA. Therefore the total amount of subsidy is € 5.6 million (€ 3.5 m from provinces and € 2.1 from ODA).

Because the KfW loan did not materialise this leaves the programme with a financing gap, but the question is how much this financing gap is. According to the original calculation above it would be € 9.6 million, but that is not the case. Excluding the subsidy as given above, the BPII programme costs are on average € 60 costs per biogas digester²¹. This includes all running costs of the BPD, training and extension, benefits to provinces, etc. Because some of these costs are fixed (not related to the amount of digesters built), that amount will tend to decrease (for example in 2008 the programme costs are € 53 per biogas digester). On the other hand there is inflation and this will increase somehow those costs, and the programme has been constantly under-spending on all support items, this might not be the same in the future, but it is likely to be so. Therefore, the programme costs will be € 8.4 million (ex-subsidy).

Therefore the total amount the programme needs to achieve the target is € 14 million, and this leaves a financing gap of € 6.8 million.

²⁰ There is already a division of the target per month, but this division is only indicative.

²¹ Budget ex. subsidy 2007 is € 1,010,251 (calculated at 20,000 VND/€) divided by 16,000 digesters is € 63 per digester. Budget ex. subsidy 2008 is € 754,007 (calculated at 23,000VND/€) divided by 15,000 digesters is € 53 per digester.

The GoN pledged to provide additional ODA and SNV is willing to provide the amount of € 2.3 million, with the condition that another donor would be found for the programme. If one assumes a likely amount of € 3 million extra ODA, the total would be € 5.3 million, and accordingly, another donor would have to bring in € 1.5 million to close the gap, but € 2 million would be on the safe side. MARD could consider to reduce the target in case this additional money is not available.

Provincial contribution

PBPDs pay a participation fee to the central account of the programme of VND 575,000 (€ 23 with the exchange rate used in this report) per digester in 2008 to contribute to the budget of the programme.

According to a document produced under guidance of MARD, the official status of which is unknown²², and that is currently referred to as “feasibility study” the contribution of the provinces should be:

Table 5.2 - Provincial and ODA contributions (VND).

	2007	2008	2009	2010	2011	Total
Target	16,000	15,000	26,000	36,000	47,000	140,000
Province share (* 1,000)	500	575	800	800	800	n.a.
ODA share (* 1,000)	500	425	200	200	200	n.a.
Provincial contr. (* 1 mln.)	8,000	8,625	20,800	28,800	37,000	103,825
ODA contr. (* 1 mln.)	8,000	6,375	5,200	7,200	9,400	36,175

The respective shares are based on the present subsidy amount of VND 1 million. With these shares and the exchange rate used in this report, the total provincial contribution will be € 4,153,000, ODA contribution € 1,447,000 for a total of € 5,6 million. If one would use the exchange rate used in the “feasibility study” (VND 23,000) then the provincial contribution would be in Euro even higher. But the budget allocation for the provinces as said above is € 3.5 million, and whatever exchange rate it will be used it will not be enough to cover these plans. Also the in the MoU agreed ODA contribution is € 3.1 million not € 1,447 million, therefore such new shares in contribution to the subsidy should be adapted in the budgeting of the BPD.

5.2.4 Level of Subsidy

There is an increasingly amount of people that claim that the level of subsidy should be increased. Their justification is the increasing construction costs especially in 2008. The costs of construction²³ of an average 8 m³ digester increased from € 250 (with the

²² The Kamphuis report [7] states that in both the MoU and the “feasibility study” it is difficult to determine what should be understood by the legal background / legal basis of the programme, because the listed documents do not have a similar legal status: a MoU is of a higher legal order than a governmental circular or minutes of meetings. It is therefore extremely difficult to assess whether all these documents fit in a coherent framework that should guide the implementation of the programme.

²³ According to non-confirmed information during 2008 in Vietnam the cost of cement increased two times, the cost of bricks three times and the cost of steel rods four times. This is obviously linked to

exchange rate at that time this was VND 5 million) at the end of 2006 to VND 7 million (€ 280) at mid-2008. Also, according to information from the management of BPII the average price of a 10 m³, mid-August 2008 is € 355 (VND 8.87 million)

However, the limited field observations of the MTR Team would seem to show that masons are constructing digesters for a lower price than the official quotation. Even though this can not be sustained with great accuracy, the fact is that the team leader back in 2004 already observed that the actual construction costs were actually lower than the official prices (one should hope, that if this is a generalised fact that this is not happening due to lowering construction standards and quality, and quantity of materials).

Another aspect that would not be in favour of increasing subsidies is the fact that Biogas Users' Surveys show and the MTR Team observations confirm, that the users that have built biogas digesters up to now can not be considered poor farmers not even to be considered poor at all (in most "biogas countries" when someone has two cows or more than 6 pigs one can not –strictly speaking- be considered poor). Some of the households visited by the MTR Team could not be considered poor even by the standards of some European countries, and this observation agrees with the observations back in 2004. Some people counter argue that the provinces visited by the Team are the richest of Vietnam (close to Hanoi) and this is a fact, but the users' survey, which are national also confirm the above observation.

Certainly that the rich farmers are always the first to reap the benefits of the biogas programmes in every country, because they are the ones willing to take the risks of an unknown technology and have the money to do so. But the next adopters will progressively be less rich households, which come at a moment when the initial subsidy is already eroded by inflation and this can limit the pace of programme implementation.

In one of the provinces (Hai Duong) visited by the MTR Team, between 2003 and 2008 they have constructed a total of 4,000 biogas digesters with subsidy while at the same an additional 4,000 biogas digesters have been built without subsidy. Maybe the costs of these biogas digesters built without subsidy are lower and this makes it more attractive to the user, to build even without subsidy. The mason may be able to reduce costs, due to the less time the mason has to spend going through the usual procedures to be able to build a digester with subsidy, which may include kick-backs to provincial officers to be given construction rights with subsidy. One can only hope that there has not been compromises in the quality of construction to reduce price. Again, this construction without subsidy may only be a localised effect in the richest provinces in Vietnam.

the staggering increase of the price of oil as these materials are energy intensive. But, probably there was also a large deal of speculation involved, as it happened in Cambodia, where the prices rose sharply until May to suddenly decrease also sharply, but not as much as the increase. This is also in a certain way linked to the decreasing oil prices, but the inflationary fluctuations can not only be justified by the oil prices.

Above observations may be subjective (not that they are not pertinent) but there is one objective indicator, the Financial Internal Rate of Return (FIRR). The FIRR as calculated in the “feasibility study” with data from 2007 indicated the following FIRRs:

	FIRR
Fuel savings	45%
The last line plus reduced use of chemical fertilisers	46%
The last line plus increase in agricultural production	58%
The last line plus the value of saved time	63%
The last line plus health related savings	67%

These are by all means fantastic rates of return, which would justify the programme even without any subsidy. Evidently that the MTR Team does not support taking away the subsidy because the next ones in line are poorer, the subsidy is already being eroded by inflation and BPII would lose its most important promotion tool and the stick that enables it to enforce quality. Also the average farmer does not reason in terms of FIRR, and likely reasons of how many pigs he/she could buy with the costs of an installation.

Observation: The same calculations were redone, using the same inputs and values included in the “feasibility study” and only for the savings of fuelwood one arrives at much higher FIRR, 377%!!! This is not surprising, because the costs are € 256, and the savings only in wood € 196 per year. Therefore the “feasibility study” must have used other variables in the calculation that are not made explicit in the text.

The calculations show that taking into account the costs of a 8 m³ biogas digester at the end of 2006 when the BPII was designed of VND 5 million, and the cost of VND 7 million in August 2008 and keeping all other parameters as in the calculation above (except the savings in fuelwood, where the average savings of VND 120,000 per month will be used as given in the Biogas Users’ Survey of 2006, and the exchange rate, which will be the one used in this report), will give the following FIRRs:

Table 5.3 – FIRR calculation.

	With loan	Without loan
Cost VND 5 m	44%	66%
Cost VND 7 m	25%	41%

Even with the new cost of the biogas digesters, the FIRRs are still very interesting, and do not justify increasing the subsidy.

The study [10] recommended to progressively reduce the amount of subsidy along the years, recommendation that the MTR Team does not support, for the reasons given above, like it does not support increasing it.

Most people that favour an increase in subsidy would like to increase it to VND 1.5 million. Assuming that this would take effect next year and remain for the last 3 years of the BPII, this would mean an additional financial burden of € 2.16 million.

Targeted subsidy for the poor

The above mentioned study [10] at the same time that recommended to gradually reduce the subsidy also recommended to increase subsidies to the poor to VND 1.5 m for households that:

- Have a monthly per capita income lower than 200,000 VND.
- Or, are mentioned in the lists of poor households of local people's committees or of local farmers' organisations, or women's organisations.
- Belong to disadvantaged groups of single-women households.
- Ethnic minorities included in "Programme 135".

However, one should be very careful with this kind of indicators because it could introduce large possibilities for fraud in the programme. It certainly also makes it more difficult for the programme management as new checks and balances need to be introduced to control the fair application of the principle. Experience in other countries shows that this practice should not be recommended, but Vietnam is a country that has a very detailed administrative system that could facilitate the application of a poverty-related subsidy. As a solution for possible frauds it would be recommended to affix publicly lists of households that have received higher subsidies.

5.2.5 ADB Loan

The GoV is negotiating with the Asian Development Bank (ADB) a loan in the amount of US\$ 25 million for a "Biogas Programme for Livestock Waste" for biogas for households and larger scale farms/enterprises. This would be a great opportunity for the GoV to fill the gap left by the not realisation of the loan with KfW, and at the same time fulfil the condition of the GoN and SNV that a new donor should be found to the BPII, in order to provide additional funding. However, as shown above the additional funding strictly required for BPII is a much smaller amount, of maximum € 2 million. The ADB loan is intended for 16 provinces, of which 10 will overlap with the existing BPII.

The loan conditions and its objectives are still not clear, but from preliminary information obtained by the MTR Team (which can be totally different in a final agreement), the following is being discussed:

1. The loan is intended to provide credit to 30,000 households in all provinces (another option for this loan is credit to only 16,000 households in 16 provinces), to the amount of US\$ 9 million (€ 6 million).
2. To provide households in 58 provinces with material kits of good quality for biogas digesters, up to US\$ 7 million (€ 4.67 million).
3. Running costs, including administration, training of technicians and masons, quality control, monitoring and evaluation for 2009 - 2014 for 16,000 biogas digesters for , up to US\$ 2.5 million (€ 1.67 million).
4. Credit to selected large scale pilots in 16 provinces, US\$ 5.5 million (€ 3.67 million).

Bullet 1 means that on average if all households would take a loan (which is unlikely) that € 200 would be available for credit.

Bullet 2 is intended as a subsidy, but is concealed as being material support (the MTR Team was told that the ADB loan conditions did not allow for the provision of subsidy). But the material kits are a subsidy and one that the GoN and SNV (and ADB for that matter) should worry about:

- First, it amounts to VND 1,070,000 which will in fact double the subsidy amount, when as analysed above, this is not strictly needed.
- Second, this subsidy is intended to be provided by the provinces that will be charged to buy the material and give it to the households. One can only imagine the amount of fraud possibilities that this will open.
- Third, this will definitely abort any idea that the BPII is heading towards a sustainable quasi market-oriented biogas programme, because the role of the PBPD will only increase, not decrease as planned.

Bullet 3 is excellent, but it will overlap three years with the BPII financing for the same activities. How is one going to control that two different sources of money are not going to be used to finance the same activity at province level? If something can go wrong, it will, and therefore precautionary measures should be taken to avoid this. Management confusion at provincial level will likely happen, if financial mechanism and QC are to be different between the two programmes.

What is meant in bullet 4 is for a different kind of market than that of small-size biogas for households, and is a market that in all countries is fully commercially attractive (except for the initial demonstration and promotion efforts).

The intention is that this loan would be linked to the current BPII, but the signals that the MTR Team has received is that this will not happen, for several reasons, including the longer period of the loan which extends beyond the timeframe of the BPII, different accounting procedures that have to be followed by the ADB regulations, and the ADB is not willing to rely on SNV (but is not SNV that will manage, the BPD is a GoV institution) for the achievement of their objectives (what about the Hanoi Declaration for Aid Effectiveness?). In fact it seems that a parallel office is going to be set to manage programmatically this loan. The fact that this loan is going to be for a parallel national biogas programme seems to be fine to MARD, ADB and SNV advisors. No concerns are shown among stakeholders as whether the ADB biogas programme may undermine the BPII at least in overlapping provinces in terms of QC and financial transparency.

5.2.6 Provision of Credit

The availability of credit (usually a targeted line of credit for biogas with favourable interest rates) is a proven method to increase the access to the biogas market for those segments of the farming and livestock holding population that are usually poor and can not afford to pay cash upfront.

A report [11] about options for micro credit commissioned by the FMO, indicated that there were several reasons that discouraged households from seeking credit for the construction of biogas digesters, such as:

- Difficult for households to access finance from financial institutions, particularly Vietnam Bank for Agriculture and Rural Development (VBARD).
- Investment in biogas does not bring direct benefits in terms of cash income.
- Rural households do not wish to be indebted and rely on own funds.
- Investment in biogas digesters (and associated animal stalls which need to be renovated) are high compared to savings and earnings by rural households.

According to the MTR Team there is another very important reason why the households that have participated in the BPI & II up to now did not ask for a loan (at least not through formal credit lines): the large majority belong to the richest strata of rural households.

A second remark is about that biogas does not provide direct benefits which is factually not true (see section 1.2 above).

A medium term credit (3 years) with a grace period is proposed by that study and interest rates should not be subsidised but at market rates, which were at the time of the study 1.2% per month (now 1.8%). Targeted credit lines for biogas are a common feature of many biogas programmes, this to be able to favour the poorer strata of the farming and livestock holding rural population. Even the above mentioned ADB credit can be provided at concessional rates as there are no other players offering loans to biogas users and these users constitute a very limited and targeted group.

Up to the moment although BPPII has been working on it, no progress has been made in this issue.

5.2.7 Institutional issues

Current institutional set-up

There are two core actors in the programme:

On the national level the BPD under the LPD of the MARD coordinates the biogas programme and is responsible for the implementation of the activities, like processing of subsidies, training, quality control, extension, marketing, administration and others. The BPD implements these activities centrally and oversees the correct implementation of them at provincial level.

PBPDs act as the provincial counterparts to the central BPD and are responsible for coordination and implementation of the programme activities like quality control, training, promotion and extension at provincial level. PBPDs are staffed by the provincial Department for Agriculture and Rural Development (DARD) and the Agricultural Extension Centre (AEC).

From the beginning of BPPII it became clear that provinces needed constant support from the central office in order to maintain the continuation of service provision like quality control, training, extension and promotion. Their role has been continuously enhanced, with more capacity building activities and experience sharing being done at provincial level.

Steering Committee

Even though the formation of a National Steering Committee (NSC) has been planned from the very beginning of the BPPII, this has never happened. The lack of a NSC has negative implications for the programme, because the political support basis of the BPPII is too narrow²⁴ (only MARD). However, right at the programme start-up, MARD tried to form a NSC for the biogas programme. However, the Committee's membership was not agreed by different Ministries, agencies and provinces at initial stage, leading to a respective postponement. Up to this moment, almost all relevant agencies have designated responsible persons for the NSC, except for Ministry of Finance, which does not agree with a NSC for non-national targeted programme in a context of numerous steering committees but ineffective operation. Nevertheless, MARD remains its determination to put the NSC in place, expectedly at the end of this November.

A NSC is an important element for taking final decisions on main programmatic issues. The NSC should function as a multi-stakeholders forum with representatives of relevant organisations, guiding and coordinating the programme. An active NSC (not only a formal one) would provide broad institutional anchoring with other Ministries. The only link to the policy level is through the Programme Director, who with all good will can not dedicate a large amount of time and attention to the programme. Also this construction is not sound for any programme, because it is too much person dependent.

On the other hand, and regardless of a NSC, close monitoring and regular direction has been provided for the BPPII from different functional departments within MARD, including the project direct managing agency - Department of Livestock Production, Departments of International Cooperation, Planning, Finance, Science and Technology, and particularly a responsible Vice Minister.

If the biogas programme wants to become a National Target Programme (which would do much to its recognition as a sector), then a strong NSC is required. The achievement of the numerical targets of BPPII depends on the provincial contributions, the approval of enough funds for this budget comes from the Provincial Governments, therefore it also depends a lot on the political goodwill of those, and the NSC can play a positive role in this.

Management issues

In Vietnam due do the growing economy with increasing job opportunities there is usually a high turn-over of personnel. Also people who work for a project with a

²⁴ Some attribute the failure to get the CDM credits to a lack of lobbying in the GoV to address all bottlenecks on time, but this is a very limited view because the CDM rules have ruled out biogas programmes from obtaining CDM credits during several years.

defined timeframe and limited organisational structure, tend to leave when they find a job in a company that offers them more perspective to grow and more job security.

The BPD turn-over is also very high, and at this moment there is a growing discontent among its staff and many people including key staff are looking for other jobs. The loss of these people would imply again delays in programme implementation. In conversations with BPD staff the MTR Team learned that people feel very frustrated by the little responsibility given to staff, lack of delegation of operational powers, with almost all decisions being taken by the Programme Director. This also slows programme implementation because no matter how willing and interested the Programme Director is, the fact is, that he has only a very limited number of days a month to dedicate to the programme.

The Kamphuis report [7] is also very clear on this issue:

“Another point of concern was that the team felt itself restricted in its operational effectiveness. Decision making by the Programme Director was experienced as slow and difficult to predict, whereas at the same time pressure to perform is mounting, given the ambitious programme targets.

Also was stated that the actual capacities of the high qualified team members could be utilised better. The checking of the high amount of completion documents during the period September - December of each production season should be done by an ad-hoc mobilised small team, especially assigned for this purpose.”

The second Kamphuis report [8] recommends:

“With the presence of the Chief Technical Adviser and the new Programme Coordinator coming in shortly, a proposal was done on delegating the programme’s operational responsibilities: they should operate as a team seeking complementarities and being both responsible for the full range of operational activities of the programme and the related budgetary transactions. Both should also take on in mutual consultation the various supporting and advisory tasks. The Programme Director should monitor and approve each quarter the programme’s activities and budget management. The Programme Coordinator has to function as the daily manager of the office’s personnel.”

Management system

The management system at BPD is affected by the following difficulties:

- Programme Implementation Document is not available. The “feasibility study” is meant to be the programme document.
- The programme is said to be run based on that “feasibility study”, but actually the budget of 2007 and 2008 are different from those in the “feasibility study”. However, the programme annual plans are always based on the approved Feasibility Study with each of its activities specified and budgeted before being approved by Project Director and SNV Vietnam’s Country Director.
- Programme reports present many different numbers, a lot of re-doing is being done at the moment.
- Planning is done without milestones and benchmarks to follow.
- Under-spending is very common year after year. It can be seen as a sign of incorrect planning and/or weak management related to implementation.

Human resources

The available human resources are insufficient, if not to say inappropriate for a period quite critical like this (financial gap discussions have to be based on concrete financial and organisational planning, increasing number of provinces, management needs to be improved quickly, target and budget needs to be re-done):

- The Programme Director has limited time to dedicate to the programme.
- The Chief Technical Adviser and the Programme Coordinator are both new.
- Staff turn-over is high and likely to continue.

The problem of manpower coupled with a weak management system, discussed above, and some internal staff conflicts in the last 2 years, make the BPD in this respect fragmented and weak.

Budgeting and budget expenditure

Budgeting procedure is (is supposed to be) done basically based on the “feasibility study”, the last-year expenditures and work plan of the programme. The problem of under-spending is very common from year to year, due mainly to the postponement or cut down of certain networking and capacity building activities.

5.2.8 Supporting services

The BPII has been implementing several promotion activities. The MTR Team observed that the quality and content of the printed promotion material is high. Also at provincial level, the PBPDs have radio and television programmes for the promotion of biogas, and biogas seems to be well known among the rural population.

The quality of training –while not so systematically organised– is high at least judging from the generally high quality of construction and skilled masons (almost 100% of the people interviewed by the Users’ Survey, say that they are satisfied with the quality of the installations and the masons). Up to now BPII organised 9 technician training courses, and 13 mason training courses.

Provincial and District Technicians have been trained by the programme to perform their duties. However, there is an increasingly number of defaults that are being found by the national QC on QC²⁵, but because there is no institutionalised way of penalising the officers involved, those findings go without consequences. Also there are increasing signs that QC is sometimes not being done at all, and that the technicians just trust the masons because they know them and know that they are qualified.

The intention of the BPII was to provide 3 training courses for all biogas users (pre and post construction training and slurry extension). Due to the increasing costs, most provinces are now providing only one training, post-completion, including the use of

²⁵ National QC should check 1% of last year’s completed installations and 0.5% of those under construction in the current year.

slurry. There is no problem with this practice as long as the provided training to the user is of high quality, but this the MTR Team could not assess.

Efforts are being taken to outsource national training and QC, which is a good move to involve more parties (but this requires better management to guarantee quality of these services). BPII is currently in the process of selecting and capacitating vocational schools in the north, central and south of Vietnam in order to increase its institutional capacities. To secure the quality of training the schools will for the current year, only be active in training. The plan is that next year their support may increase with quality control and to act as public information centres for household biogas technology. This is done in cooperation with a capacity building programme called Voctech, supported by a Dutch NGO, called NUFFIC.

The MTR Team observed and this is confirmed by the findings of Users' Surveys that of after sales service is still lacking proper implementation, some users even did not know that the masons have to provide this assistance. This obviously needs to be improved. In the guidelines for PBPDs, 0.5% of the provincial target budget is set apart for after sales service. Also according to guidelines households can call provinces, and the technician and mason must attend to the problem. Even the national BPD gets phone calls and calls the provinces for the problems to be solved.

Warranty on digester for households is 1 year, masons deposit VND 1 million at PBPD to enforce after sales service or money will be allocated to let other parties provide this service. This is a good feature of the programme, if enforced properly.

Compared with the previous experience (in 2004 and 2006) of the MTR Team it seems that users have now more understanding of the value of slurry. Slurry use is still variable but is picking up. Main reason for not using slurry is lack of agricultural land.

5.2.9 CDM

Due to CDM Executive Board decisions regarding methodologies and the hesitant approach by the GoV in the pursuit for CDM revenues for the biogas sector, these benefits have not yet materialised. Nevertheless two Project Implementation Notes have been approved by the Vietnamese Designated National Authority and one draft Project Design Document has been made with support from Mitsubishi securities. However in this programme document the validation would remain risky.

Uncertainties around the feasibility of CDM revenues were as a matter of fact also the reason for the decision of the Ministry of Finance not to take the loan from KfW to finance BP II. This decision was made in August 2007, which has put the progress of the BPII under pressure.

However this year new dynamics are witnessed, ADB shows serious interest to support the CDM process, SNV puts great efforts in it and the GoV is increasingly aware of the opportunities. To showcase that carbon credits can become a real option, SNV

facilitated the selling of 30 biogas digesters to the Dutch rock band Normaal and to a consultancy bureau called MDF.

Size selection and CDM

Selection of the size of the digester is based on the number of animals not on the number of family members and energy requirements of households. In the two Biogas Users' Survey reports all households mention environment as a main reason for installing the biogas digester, 97% mention the reduction in costs of cooking fuels. This means that people basically install biogas to get rid of the large amount of pig dung that causes large problems with neighbours because of the smell, and large sanitation problems in the farmyard. Even though many digesters are underfed²⁶, the gas production largely exceeds the energy requirements, even though households also use biogas for preparing the pigs feed often substituting totally previously used wood and other biomass, and some households even burn the gas in the winter to warm up the house. Also the introduction of a biogas rice cooker could be beneficial for the programme as people still prefer to cook rice on electric rice cookers, a gas rice cooker costs US\$ 35 in China. According to the Biogas Users' Survey 2005 the excess gas is for 36.4% flared (as it should be), 18.2% gave biogas to neighbours (beautiful side effect), and 45.4% was vented out.

This last practice can endanger the proposed selling of emission reduction rights, because if this practice really happens on a large scale then this would jeopardise obtaining CERs.

And the leakage can even be larger when people do not use enough gas, because if the pressure in the digester is too high (for example during the night) biogas will escape anyway via the expansion tank.

Evidently that without biogas digesters some of the pig dung would end in rivers and lagoons where it also would cause large environmental problems and methane emissions.

5.2.10 Other issues

Quality Control

There are many signs that quality control at provincial level is not being done according to the rules. The information obtained is that sometimes district technicians do not make the required visits per digester or do not do it at all. This happens often when trust is already built between technicians and masons. All visited provinces mentioned no poor quality digesters, but this is unlikely to be true. On the other hand, Users' Surveys show an overwhelming majority of satisfied users. The MTR Team observed some biogas digesters that deviate from the standard design and material quality that was also not standard.

²⁶ This is especially the case after the outbreak of the "Blue ears pig disease" that decimated the pig population in many provinces of Vietnam.

QC is essential for the credibility and future of the BP, and BPD should prevent that QC is only done on paper (and Biogas Users' Surveys have signalled that some digesters have not been visited by the biogas technicians to check on quality). This lack of control has been confirmed by other means.

Also, the national QC on QC has found defaults in construction that should have consequences for the masons who built the digesters and for the PBPDs staff (the PBPDs have the ultimate responsibility) that approved these digesters as complying with the quality standards, but MARD opposes this. If MARD would approve, one way of penalising non-compliance is to keep in a national account of the BPD a percentage of the incentives that are given to PBPDs (for example 20%) that would only be released if no substantial (what this means will need to be defined) deviation is found from the quality standards, in the digesters built during the past year. Coupled with this, administrative warnings should be issued by the MARD at advice of the Programme Director for those people non-complying with regulations.

Masons who built these digesters could lose their accreditation with the BPII if they persist in building inferior quality digesters even after they have been made aware of the problem and warned.

Transfer of subsidy to the users

Because there have been substantial delays of transferring the subsidies to the users, it has been suggested that one should look into another subsidy delivery mechanism, also because this transfer costs money.

The MTR Team does not see any reason to change the subsidy transfer system because the delays are not caused by the postal services (at least not for the largest part), and second, the costs are very limited and favourable (only 1.5% of the transferred money, VND 15,000).

Mason organisation

Masons are already working together in teams of 3 to 4 people, competition is fierce. In some provinces there are already some established biogas construction "companies". But mostly, company establishment is done in a very informal way: one very specialised mason with entrepreneurial spirit hires less specialised masons to work for him, and he only does the most difficult and specialised parts of construction and guarantees the quality of the overall construction. This obviously increases his profit margin, and one of these business masons informed the MTR Team that he even gave some discount on the construction for poorer households.

5.3 Recommendations

Policy, Institutional and Management Issues

In order to get more support for the biogas programme and especially for getting the provincial contributions approved, the MARD vice-minister should annually send a letter request support to Provincial Peoples' Committees and to the Ministry of Finance, besides to the Provincial Agricultural Departments like it is happening now.

It is recommended to institutionalise and install an active and representative NSC, with the composition and functions described in the Kamphuis report of June 2008 [8]. The NSC is needed among other things to lobby to make the biogas programme a National Target Programme. However, the MTR Team does not see in which the formation of provincial SCs would enhance the implementation of the programme.

In line with the recommendations of Kamphuis it is recommended that the Programme Director delegates management responsibilities to the Programme Coordinator in order to make the work of the BPD more relevant and effective. It is also recommended that the Programme Director has more time for the programme (at least 10 days a month) or if this is not possible that operational and financial management are delegated to the Programme Coordinator (assisted by the Chief Technical Adviser). The above should take into consideration the fundamentals of project management given by the GoV.

It is recommended to establish a stronger management system with (1) tasks and roles of the management team clearly defined, and (2) good management tools in place. Also some management training for the top-staff should be given to ensure mutual understanding and improve effectiveness. This stronger management system can at the same time improve effectiveness of the available human resources.

It is recommended that one is more careful with planning and budgeting for the next year. Also, if an activity is budgeted this budget should be spent, unless there are strong reasons for not doing it. The Programme Director is now approving all expenses, but he has severe time limitations which introduce delays in approval. This approval, subject to criteria and rules (to be eventually agreed between MARD and SNV), should be delegated by the Programme Director to the Programme Coordinator with the cooperation of the Chief Technical Advisor²⁷, with the Programme Director having an "a posteriori" final controlling task.

It is recommended to look into the possibility to transfer directly the incentives to the district technicians and commune workers through the postal service. Obviously that this by itself would not stop any eventual kick-backs but is another step to make things more transparent and take away unnecessary functions from the PBPDs.

It is recommended to stop with the practice that the PBPDs appoint the masons that will construct the biogas digesters at a certain household. Instead, provincial lists of certified masons should be made public and publicised through the media, and it is up to the households to choose and negotiate with the masons. Only biogas digesters built by these masons are entitled to get subsidy.

ADB Loan

It is recommended that SNV approaches ADB to learn more about the exact loan conditions and to eventually convey its concern if the conditions described above apply.

²⁷ Notwithstanding the ownership of the BPII by the GoV, there seems to exist a gentlemen's agreement with MARD regarding SNV's supervision on the utilisation of Dutch ODA in the programme. The same applies also for the appointment of key programme personnel.

To manage the negative effects that the ADB programme may have on BPII, it is recommended that negotiations at high level (MARD + GoN or SNV + ADB) take place to analyse the risks and come up with adequate conditions for the application of the ADB loan.

It is recommended that the GoN and SNV look carefully into the conditions of the loan to be agreed between the GoV and ADB, and make additional financing for BPII dependent on the following conditions:

1. Do not accept that additional subsidy is given to the biogas digesters at least in the provinces the BPII is active, and not in the form planned (in-kind contribution via PBPDs). This implementation aspect will difficult even more the objective of a biogas market orientation, and introduce new avenues for corruption.
2. Do not accept that administration, training of technicians and masons, quality control, and monitoring and evaluation costs are going to be paid in the same provinces that the BPII is active, as long as that is the case.
3. Clearly define what is considered large-scale (size). If the BPII finances installations up to the digester volume of 15 m³, the boundary of the large-size for the ADB programme should be put at least at 20 m³.

BPII Timeframe

Even though there is no lack of demand for biogas digesters it is very difficult for BPII to meet its target in 4 years, therefore it is recommended that the “de facto” extension to 2011 be accepted, also to allow BPII to consolidate its efforts and to properly transfer the biogas programme fully to the MARD. At this moment there is still no strong evidence that the BPII will need to be extended into 2012, however, there can be developments that force the programme to be extended into 2012, but this should be again considered in the near future (by the end of 2009).

Acceptance reports

Even though the yearly targets for the provinces are also divided by month, no one really seems to control the achievements in this way. It is recommended that BPII agrees with the provinces to send the acceptance reports monthly and agree on a deadline for sending the acceptance reports, with a penalty imposed to no compliance with the deadline, for example, a 10% decrease on the incentive given for the reports not sent on time.

It is recommended to change the moment that the acceptance report is to be filled in accordance with the best practices in other countries. The acceptance reports should be filled when digester is completed but still empty. This has the additional advantage that it would force the technician to go to the location, because otherwise the households would be complaining. This acceptance or completion report is to be signed by the provincial or district technician confirming that the digester is built according to technical specifications, and by the user confirming that the digester has been officially handed over to him/her.

It is recommended to institute a National Telephone number for complaints at the BPD. This number should be given to all households in a plasticised form or as a sticker, and also publicised in the media.

Subsidy and credit

The shares of the provincial and ODA contribution to the subsidy have been changed, related to the original MoU, therefore change the whole BPII budget accordingly.

The MTR Team does not recommend increasing the subsidy amount for the reasons given in the analysis above.

Also it is recommended not to differentiate the subsidy by size, a flat rate favours smaller sizes that in this way can remain affordable for poorer households.

As a possible measure to reduce the impact that the erosion of the subsidy due to inflation can have for poorer users to enter into the biogas market, one should look carefully at the possibility to introduce a poverty-related subsidy. However, extreme care should be exercised with possible fraudulent practices that can undermine the whole principle (suddenly everyone is poor...).

The MTR Team recommends that the subsidy transfer system should not be changed, because it is functioning well and with reasonable costs. In any case the subsidy transfer should never be done by intermediation of the PBDs, because this goes against the principle that PBDs should be given less, instead of more responsibilities, and because this again would introduce a possible avenue for fraud.

It is recommended to look into the possibility of having a targeted and concessional credit line for biogas users. Because this product is exclusive to the biogas users the possibility of market distortion is small. This credit line would also be beneficial for poorer households, which have no up-front cash availability.

Guaranties and after sales service

It is recommended to enforce the obligation of providing after sales service. Concerning guaranties and the fact that some users do not want to sign the acceptance report (they should be obliged to sign as part of contractual obligations to get the subsidy) it should be made very clear to the user (they often do not know this) that the mason has deposited an amount of money to cover warranty obligations. Also, the possibility should be introduced that the users negotiate with the masons that they keep a small percentage of the labour costs to be reimbursed later, but this should not be made mandatory.

Slurry extension

It is recommended to enforce slurry extension, even though the BPII is improving this aspect. For users that have no use for the slurry one could promote slurry drying and marketing as an extra source of income. This obviously would need some research efforts of BPII and publication of guidelines for slurry drying (Bangladesh has good information available).

Quality control

It is recommended to establish criteria for defaults on QC (all biogas programmes have them) and set penalties to QC not being done properly by PBDs. In order to be able to

enforce this, 20% (or any other acceptable percentage, but enough to “harm”) of the benefits related to QC should be kept in a national BPII account to be disbursed only when the sample national QC proves that there are no significant (to be defined) deviations from the criteria. Besides PBPDs should get an administrative warning from MARD at advice of the Programme Director.

The situation now is that PBPDs are responsible for the QC control of digesters built under their responsibility, and this is not the soundest solution. Also in order to work towards a more market-oriented biogas sector one should study in the near future (when the biogas market is more consolidated) to outsource also the QC functions of the PBPDs to a kind of “district” auditing firm. The GoV via the MARD will still and always have the ultimate responsibility to protect the users and assure that this independent QC is doing its job properly. This solution -when there is a sufficient large market, what is not the case now- does not need to be more expensive than the present one, because these private firms can in principle work much more efficiently than a government institution, by an adequate planning of activities and a commercial interest to do it efficiently.

Organising masons

It is recommended that BPD budgets and spends resources to provide managerial training and basic business skills, such as in promotion, marketing and book keeping to masons with entrepreneurial spirit and proven organisational capacity.

References

- [1] Mid term review phase I, J. Castro. September 2004.
- [2] Report BP I 2006, report on the achievements of BPI
- [3] AITCV Evaluation BP I 2006, evaluation of the achievements BPI
- [4] Memorandum of Understanding for BP II, 2007 – 2010, Hanoi, 6/7/2006
- [5] Annual report 2006.
- [6] Annual plan 2008
- [7] Inception Mission Interim CTA Biogas Programme Division, Eric Kamphuis, April 2008.
- [8] Second Mission related to the functioning of the Biogas Programme Division of BP II, Eric Kamphuis, June 2008.
- [9] Guideline for Programme activities at Provinces, 2008.
- [10] Mission Report on Project Preparation, Ulrich Otten, Report on the socio economic background of biogas users, commissioned by KfW, July 2006
- [11] Financing Framework for Biogas Users, Farook Chowdhury and Luong Dinh Lan, August 2006.
- [12] Biogas Users' Survey, 2005
- [13] Biogas Users' Survey, 2006
- [14] Project document: untitled report produced under guidance of MARD, commonly known as the "Feasibility Study".

List of Persons Met

No.	Name	Position	Remarks
BPD, 22, 26, 28 and 26 August 2008			
1.	Dr. Nguyen Thanh Son	Director, BPD	
2.	Mr. Jeroen Kruisman	CTA, BPD	
3.	Ms. Nguyen thi Minh Tam	Program Coordinator, PBD	
4.	Ms. Nguyen thi Bich Van	Head, Administrative Department	Joined the team to Ninh Binh
	Mr. Teune Bastiaan	TA, PBD	Joined the team to Hanoi
5.	Ms. Thu	Head, Technical Department	Joined the team to Hai Duong
Hanoi PBPD and households, 22 August 2008			
6.	Mr. Giang	Vice Director of AEC	In group
7.	Ms. Luyen	Project Deputy Director	
8.	Ms. Mai	Project Accountant	
9.	Mr. Duc	Technician I	
10.	Mr. Hung	Technician II	
11.	Mr. Hong	Technician III	
12.	Mr. Hieu	District Technician	
13.	Mr. Hung	Mason	Has his own biogas construction and trading enterprise
14.	Mr. Viet	Mason	
15.	Mr. Nhoi	Mason	
16.	Mr. Luong	Beneficiary household	Plant is under construction
17.	Mr. Ngo van Cong	Beneficiary household	
Hai Duong PBPD and households, 25 August 2008			
18.	Mr. Hanh	Project Deputy Director	
19.	Ms. Kim	Project Accountant	
20.	Mr. Dat	Provincial Technician	
21.	Mr.	Mason	
22.	Ms.	Beneficiary household	
23.	Ms. Luyen	Beneficiary household	Normaal Project
Ninh Binh PBPD and households, 27 August 2008			
24.	Mr. Binh	Project Director, Vice Director of DARD	
25.	Mr. Giang	Project Deputy Director	
26.	Ms. Bon	Project Accountant	
27.	Mr. Tuyen	Provincial Technician	
28.	Mr. Nguyen	District Technician	

No.	Name	Position	Remarks
29.	Mr. Cuong	Mason	
30.	Mr. Hoang Anh Tuan	Beneficiary household	Plant was completed 5/2008
31.	Mr. Mai Quoc Hieu	Beneficiary household	Plant was completed 4/2007
Ninh Binh Vocational School, 27 August 2008			
32.	Mr. Nhue	Rector	
33.	Mr. Nguyen Duc Toan	Vice Rector	
34.	Mr. Pham Thanh Binh	Head, Department of Construction	
SNV, 28 August 2008			
36.	Ms. Andy Wehkamp	Regional Director	
37.	Mr. Tom Derksen	Country Director, Vietnam	

This page was intentionally left blank

Chapter VI – Partnerships and Networking

6.1 Introduction

The ABP document foresees a number of partnership and networking activities and the MTR Team leader is supposed to also evaluate the efforts by SNV in this regard. Large construction activities are going on in India and China totalling around 17 million completed biogas digesters and also a lot of biogas activities are going on in both countries with regard to R&D, financing, promotion & marketing, training, extension, monitoring, organisational & institutional development. To have direct access to these experiences, SNV was supposed to enter into strategic partnerships with a few institutes in both India and China.

In addition, SNV intended to establish a small effective network with representatives of major biogas institutes in Asia. This network includes the key partners in the countries targeted by SNV. The members of the network will communicate with each other through Internet, conferences and other channels. The main agenda would be to exchange information, identify common problems in the large-scale dissemination of biogas and possible actions to solve such problems. Twice a year, the network members would personally meet, followed in every second year by a conference to which a wider audience would be invited.

6.2 Findings

The table below shows the main events (co-)organised by SNV under the activity of “partnerships and networking”.

Table 6.1 – Events organised under partnerships and networking.

Event	Number of Participants		
	SNV	Non-SNV	Total
International Seminar on “Biogas Technology for Poverty Reduction and Sustainable Development” co-organised with the United Nations Asian and Pacific Centre for Agricultural Engineering and Machinery (UN/APCAEM) and the Chinese Ministry of Agriculture in Beijing, China, from 18 to 20 October 2005	11	11	22
Network meeting on promotion of household biogas in Hanoi, Vietnam on 5 and 6 April 2006	8	8	16
International workshop on the use of bio-slurry from household biogas digesters in Bangkok, Thailand, on 27 and 28 October 2006	13	38	51
Network meeting on quality control in the framework of national biogas programmes in Dhaka, Bangladesh on 26 and 27 March 2007	13	8	23
Testing of biogas stoves and lamps by three institutes in China, India and the Netherlands	-	-	-
Bio-slurry study tour to Nepal from 11 to 15 September 2007	4	12	16
Network meeting on private sector development in the framework of national programmes on household biogas in Phnom Penh, Cambodia on 29 and 30 November 2007	18	20	38
Network meeting on the development of household biogas appliances in the framework of national programmes on household biogas in Vientiane, Lao PDR on 3 and 4 April 2008	13	10	23

Four network meetings and two international workshops have been organised in which both SNV and non-SNV (counterparts, experts) participated. The issues addressed were promotion, CDM project development, application of bio-slurry, quality control, and private sector development.

To further improve the performance of biogas appliances, three different institutes in China, India and the Netherlands were contracted in 2007 to test different biogas stoves and lamps. In September 2007, a bio-slurry tour to Nepal was organised.

In order to assess the quality of these initiatives two paths have been followed: (1) to read and evaluate the proceedings of the workshops and (2) a questionnaire was spread under all participants.

Reading workshop reports and proceedings is only a proxy for assessing its usefulness. However, from this lecture the conclusion is that the workshops were well organised, that the participation and motivation was high, and that the workshops achieved their objectives.

The following questions were asked to participants in workshops, study tours:

- 1. Workshops/meetings**
 - (1) Are workshops well organised (you can if you wish specify per event attended)?
 - (2) Would you suggest a different approach for the workshops? Which?
 - (3) Are the subjects that have been discussed relevant for you?
 - (4) What other issues would you like to be considered in future events?
- 2. Study tours**
 - (1) Are study tours well organised (you can if you wish specify per tour you have participated)?
 - (2) Would you suggest a different approach for the study tours? Which?
 - (3) Has the study tour been relevant for your own professional involvement with biogas?
 - (4) What is your assessment of the effectiveness of this kind of initiatives (taking into account that they are costly options)?
- 3. Web site**
 - (1) Would a Web site for the Biogas Programme be useful for you and for the programme?
 - (2) Experience shows that some of these sites that have been set up with the best intentions as a forum for discussions among members, are not successful, there is hardly any interaction. If this is true, would such a site still be useful as a source of information both for the countries and partners involved, and for the outside world?
- 4. Any other comments suggestions, etc.**

From the 65 questionnaires sent, 19 persons answered. In Annex II a summary of the most specific answers is given. An analysis of the answers shows the following:

Question 1.1

All participants agreed that the workshops were well to extremely well organised, with all information provided to participants in time. One or two persons suggested that the time was too short and one or two days more could have been useful. Another aspect was that the field trips were in general highly appreciated.

Question 1.2

Most people agreed with the approach followed in the workshops. Some suggestions:

- Set up a separate “initiation” session to introduce newcomers to the biogas (advisory) practice. The more experienced colleagues may not benefit from going over the same basics repeatedly.
- Involve more not-so-senior advisors, for them to get more exposure to the biogas expertise.
- The Strengths, Weaknesses, Opportunities and Threats should have been documented, edited and published with the proceedings.

- Selection of participants could have been more consultative so as not to miss important participants for their contribution to the workshop or for their learning.

Question 1.3

All but one considered the subjects to be relevant to them. One person mentioned that not all subjects were relevant for him. One participant remarked rightly that: "Considering the fact that the participants of the meeting come from different backgrounds with various expertise, it is difficult for all the issues to be (equally) relevant to all. So, some issues are more relevant and some less. Nevertheless all subjects discussed are related to the biogas sector."

Because as mentioned in one answer the subjects are fixed in a participatory approach, and considering the answers to this question, it means that the selection of the participants is well done.

Question 1.4

A number of good suggestions were given:

- More presentations from people outside the biogas community, in areas such as village marketing, decentralisation.
- The link with other SNV (enterprise development), DGIS (sanitation programmes) and specific embassy programmes could get more attention.
- Mainstreaming the biogas approach in laws and education could be interesting.
- Invite a number of biogas owners to share how his/her life has been changed with biogas.
- Successful project stories can be shared with the participants.
- CDM, pro-poor orientation of the programmes, cost benefit analysis of cheaper designs, etc., are possible subjects.
- Issues related to bio-slurry management and utilisation, its marketing and financing, improvement of livelihood of biogas digester owners by improving their farming systems.
- Improved and low-cost biogas appliances and accessories (burner, lamp, pipe line); health and environment benefits (reduction in indoor air pollution, elimination of breeding of flies and mosquitoes). A seminar on improvement and standardisation of appliances and accessories may be organised.
- R&D in general and on reducing digester cost and minimising programme cost and maximising services.
- Biogas from biomass (or biomass in combination with cattle/swine dung).
- Workshop on bottlenecks in the generation of small scale electricity from biogas.

Question 2.1

All answers to this questions were positive about the fact that study tours were well organised.

Questions 2.2

No changes to the concept were suggested. One suggestion was that the follow-up of study tours should be well documented and shared to network members.

Question 2.3

All answers considered the study tours to be relevant. Some specific answers:

- I used to think biogas was only for energy. I have realised the importance of energy as well as slurry.
- After I came back I was able to advise the biogas programme in my country on different ways of bio-slurry application, and since that time bio-slurry has been upgraded and focused on in our programme.

Question 2.4

All answers considered study tours to be an effective way of sharing knowledge and experience. Some specific answers:

- Study tours are useful mainly for the new persons however, strong follow-up on utilisation of the tour experience needs to be strengthened.
- Our partners need exposure to diverse experiences in various countries and regions in addition to exposure to technology.
- Not having these study tours would make the network activities rather abstract and only meeting in a workshop would have little added value.

Question 3.1

Most answers were positive about having an ABP website. Some specific comments:

- To highlight the identity of each individual national biogas programme it is recommend having a website per country. Established websites like HEDON etc could make web-links to the individual websites.
- SNV has definitely the most important pool of knowledge when it comes to promotion of biogas globally. A Web Site of the programme will be very useful to disseminate the information useful for programmes as well as for general public.
- A website could be useful but maybe this should be done in cooperation with other biogas programmes. In my view it should be a database of best practices and a forum to present developments (not a forum for discussion).

There was one discordant answer:

For me personally, I do not see an additional value for the separate website of the ABP. Moreover, the country specific programmes have their own websites. Hence, I doubt the additional value of the website of ABP.

Question 3.2

These are some of the most relevant answers:

- Indeed it would, again on a technical side it is madness that we are wasting money designing products for use in one country when the products have already been designed (and paid for) elsewhere. We could save time (and SNV money) if we have full access to other countries technology and R&D via a quick reference site.
- A Web site could be useful from my point of view if it sticks to simple principles: be practical and stay that way and aim at providing practical information to a limited number of people involved in the development and implementation of biogas programmes. Nothing against more comprehensive approaches, discussion fora and the like, but the experience suggests: don't mix, don't try to cater to too

many different needs on the same website. Experience also suggests that it can only work if a competent and dynamic person is put in charge.

- Keeping up a good (annotated) document library is a seductive feature.
- If one has a specific question on biogas be it related the technology, financial aspects, etc., one could contact an expert directly. Therefore it would be helpful to have an overview of who are the experts and their specific expertise.
- Maintaining a website will certainly provide room for access to information/development in the sector. I believe this will also be helpful to partners as well as the outside world.

Question 4

Some good suggestions were given. A selection:

- There seems to be no global unity with all (or nearly all) national bodies unwilling to share and have open meaningful discussions with others. I feel that SNV through its technical and financial support, could play a greater role in breaking down these barriers and get real collaboration between countries.
- Many other countries in Asia and other parts of the world are aspiring to promote biogas in their countries. SNV has to find a way to address their queries and help them find their way forward. The Web Site could be a good way to handle that without much cost. Someone sitting in a programme country can be made responsible to handle the queries on behalf of the programme, even on a part time basis.
- A booklet on bio-slurry, encompassing the field experiences of different countries.
- A report on work done and in progress on sanitation and environmental aspects of household biogas digesters, how to maximise such benefits and future line of work.
- A booklet on Biogas burners and lamps: designing and manufacturing, country-wise standard specifications, maintenance and repair, etc.
- A study report on masonry biogas digesters versus industry manufactured digesters (made of plastic).

6.3 Conclusions

From the analysis of proceedings of the workshops and of the answers of a number of participants, it seems that these initiatives are well organised and highly valued. Some of the remarks summarised above, can be very valuable in fine-tuning these initiatives and of programming new events.

Annex I - ToR for a Mid-Term Review of the Asia Biogas Programme

1. Introduction

In November 2004, SNV Netherlands Development Organisation submitted a draft proposal under the name of the Asia Biogas Programme (ABP) to the Environment and Water Department of the Netherlands Ministry of Foreign Affairs (DGIS/DMW) [1]. This proposal aims to provide access to domestic biogas for 1.3 million people over the period 2005 up to 2011. Based on this proposal, the Dutch Minister for Development Cooperation, Ms. Van Ardenne, signed a Memorandum of Understanding (MoU) with SNV on 14 December 2004 during the Energy for Development Conference in Noordwijk, the Netherlands. On request of DGIS/DMW, SNV submitted in April 2005 an Addendum to the ABP proposal [2]. The Grant Document for a period of two years (2005 and 2006) was issued by DGIS/DMW in May 2005 [3]. The Technical Assistance (TA) by SNV and the management fee of 7.5% were excluded. In April 2006, the Grant Document for the full programme period up to 2012 was issued by DGIS/DMW [4], allocating a total amount of Euro 12.926 million as a contribution to the Programme.

The overall objective of the ABP is to further develop the market for biogas as an indigenous, sustainable energy source in selected countries in Asia. More specifically, the Programme aims to expand the Biogas Programme (BP) in Vietnam through support to the implementation of phase II; to support the launch and implementation of biogas programmes in Cambodia, Bangladesh and Lao PDR, and; to establish strategic partnerships with relevant institutes in China and India and to create a regional network of partners in biogas.

The incorporation of the different country programmes into one regional programme was pursued to enhance learning, effectively develop knowledge and make deployment of TA more efficient. In addition, it was thought that the regional approach would also have a positive impact on the willingness of crucial partners like governments and credit institutions to participate in the respective country programmes.

The total budget of the Programme was estimated to be Euro 69.5 million. A number of parties were identified to contribute to the financing of the Programme: Farmers through cash payments or biogas loans (25%), an innovative Clean Development Mechanism (CDM)-credit facility in Vietnam (39%), respective Governments in Asia (8%), SNV funding of Technical Assistance (TA, 9%) and Official Development Assistance (ODA, 19%). The main risks associated with the ABP were related to the timely availability of credit for biogas farmers and the uncertainty of the outcome of the negotiations related to CDM.

As the proposal for the Asia Biogas Programme was submitted just as an outline, it included a modality that more detailed country implementation documents for the whole period of implementation had to be submitted to DGIS at a later stage for endorsement. Such endorsements were requested and provided by DGIS for Cambodia (February 2006 [11,12]), Bangladesh (February 2006 [11,13]) and Lao PDR (May 2006 [14,15]). Due to the problems around the proposed innovative CDM-credit facility, such

document could not yet be submitted for Vietnam; in stead, approval of the plan & budget for the years 2006 up to 2008 was requested and granted on an annual basis as part of the consolidated annual plan & budgets.

This paper presents the Terms of Reference (ToR) for a Mid-Term Review (MTR) to be commissioned by SNV.

2. Progress up to 2007

In all four targeted countries, biogas programmes have been prepared, SNV advisors were recruited, agreements with implementing partners were signed and a start was made with the implementation of the programmes. However, compared to the ABP proposal, there has been a significant lower production of biogas plants. The main reasons for this are:

- Complications with the mobilisation of CDM revenues for the programme in Vietnam. An unexpected ruling by the Executive Board (EB) of the CDM deleted a small-scale methodology on the use of a non-sustainable biomass baseline. This made the Government of Vietnam (GoV) to reject a soft loan from the German Development Bank (KfW) in the framework of the “Special Facility for Renewable Energies and Energy Efficiency”, as repayment through CDM revenues was no longer guaranteed. This severely affected the production rate for Vietnam in 2006 and 2007, and will continue its negative effect on the achievement of the target in 2008 as well;
- Delay in receiving the Grant Document from DGIS/DMW which made it difficult to fully engage in the preparations of the programmes and to strike agreements with governments and implementing partners for the full period of implementation. This delay affected the progress in 2005 and 2006;
- Delay in the launch of effective credit products for prospective customers. This delay affected the progress in 2006 and 2007, especially for the programmes in Cambodia and Bangladesh.

Vietnam:

After the successful termination of its first phase [16], the preparations for the second phase of the biogas programme as included in the ABP proposal could not be finalised in time. As already identified in the ABP proposal as a high risk, this was due to complications with the mobilisation of CDM revenues. To gain some time required for getting support of this new approach and to avoid creating a gap in continuation of the programme, SNV and MARD agreed to consolidate the annual targets until financing gap was covered. In April 2007, the programme won the Energy Globe Award 2006. At the end of 2007, a total of 15,022 biogas plants were realised²⁸.

Bangladesh:

Based on preparations conducted in 2004 and 2005, an agreement on the implementation of the National Domestic Biogas and Manure Programme (NDBMP) in Bangladesh was signed in May 2006 between Infrastructure Development Company Ltd (IDCOL) and SNV. The programme was started with the signing of agreements

²⁸ In addition, the construction of another 7,000 units was completed at the end of 2007, with checking and subsidy payment due for 2008

with Construction Participating Organisations (CPOs) and training of their manpower. In April 2006, a KfW mission visited the programme to appraise the possibilities for the provision of biogas credits to potential customers. This mission concluded positively and signed minutes of meeting with the Government of Bangladesh to provide biogas credit over the period 2007 up to 2010 as well as programme fund for the year 2010. Unfortunately, the KfW grant was not yet materialised at the end of 2007. IDCOL mobilised some of its own fund through Lending Participating Organisations (LPOs). At the end of 2007, a total of 2,321 biogas plants were realised.

Cambodia:

Based on preparatory activities in 2005, the signing of the implementation arrangements for the National Biodigester Programme (NBP) in Cambodia was done in March 2006 between the Ministry of Agriculture, Forestry and Fisheries (MAFF) and SNV. These arrangements opened the way for the implementation of activities in three provinces through Provincial Biodigester Programme Offices (PBPOs). An agreement was reached with ACLEDA on the channelling of the investment subsidy to the farmers. In March 2007, NBP signed a MoU with a NGO, the Center for Study and Development in Agriculture (CEDAC), for the promotion of biogas plants, users' training and slurry extension. In December 2007, a credit facility was launched by a MFI called PRASAC with support by the Netherlands Development Finance Company (FMO). At the end of 2007, the construction of 1,446 biogas plants was completed.

Lao PDR:

After a long period of preparations and making a change in the selection of the most appropriate implementing partner, a MoU on the implementation of the plan was signed between the Ministry of Agriculture & Forestry (MAF) and SNV in November 2006.

At the end of 2007, 110 biogas plants were realised.

Activity partnerships & networking:

Up to 2007, four network meetings have been conducted in which both SNV and non-SNV (counterparts, experts) participated. The issues addressed were promotion, CDM project development, application of bio-slurry, quality control, and private sector development. To further improve the performance of biogas appliances, three different institutes in China, India and the Netherlands were contracted in 2007 to test different stoves and amps. The results of these tests will be used to improve the quality of the appliances. In September 2007, a bio-slurry tour to Nepal was organised.

3. Objective and activities of the Mid-Term Review

The main objective of the MTR is to assess the progress of the Asia Biogas Programme and to provide recommendations for the implementation of the Programme for the remaining period.

The MTR shall include but may not be limited to the following activities:

- Assess the progress of the programme, the budgeting and planning by the country programmes and judge whether the stipulated targets can be achieved within the programme period;

- Assess the quality of the capacity development services and of the undertaken programme activities, especially construction and after sales including related quality control;
- Assess the finance mechanisms of the biogas programme such as subsidy funds, credit funds, possible carbon trading and working capital as well as the increased costs of biogas plants (higher prices of materials and labour), and define if these comply with the programme needs and targets;
- Assess the financial viability of the biogas plants for the average farmer under the present conditions;
- Assess the appropriateness of programme implementation and management arrangements in each country, keeping in view the principles of the Paris Declaration, organisational structure, staffing (quantity, quality, and adequacy), monitoring arrangements, reporting and planning;
- Assess the quality, quantity and timeliness of input delivery by the national stakeholders and actors and assess their current and possible future roles and commitments.
- Assess to what extent the biogas sector in the countries are developing towards market oriented sustainability, and;
- Assess the relevance and appreciation of the country programme to the national PRSP and local development priorities and needs to fulfil the overall goal of MDG.

Based on the above activities, the MTR mission will draw specific conclusions and make recommendations for further necessary action by SNV, implementing partners and possible other actors, in order to ensure progress and sustainability of programme achievements. This includes amongst others:

- Identification of lessons learnt in the programme to date (strengths, weaknesses, opportunities and threats), suggesting reasons for particular successes and failures and proposed changes;
- Proposal for financial modalities (including institutional analysis) which could increase efficiency at field level, and;
- Proposal for a revised time schedule for the achievement of the stipulated targets and application of the DGIS contribution.

4. Methodologies

The review requires the study team to undertake visits to the respective countries: Vietnam, Cambodia, Lao PDR and Bangladesh. For each country, the MTR team will be connected by an SNV advisor to the implementing partner and other involved stakeholders. This advisor will also make available an overview of documents related to the programme in the country. Field visits, interviews, small workshops and focus group discussions may all be conducted by the MTR team.

For the sake of proper preparation, the MTR team will be provided well in advance with all relevant documentation (the references included in this ToR though the SNV Biogas Practice Leader as well as the country-specific annual plans & budgets and annual reports through the country-based SNV advisors), and upon request also with hard copies upon arrival in the countries. The respective country programme offices will prepare a list of organisations and people to be met, with a very brief explanation

on the relevance of the meeting. The MTR team is free to request for additional meetings if felt needed.

5. MTR team composition

The MTR will be conducted by one independent international expert acting as the team leader, accomplished by an independent national expert in each country.

The team leader (to be engaged for 40 days) should have at least 6 years of experience with relevant background (in renewable energy management, socio-economic and market development, MTRs/evaluation) and a solid experience in business development work that involves multiple stakeholders. S/he shall have excellent analysis and writing skills in English and be a good communicator.

The independent national experts should have at least 6 years experience in the promotion of renewable energy and small-scale rural infrastructure. Exposure to and experience with multi-stakeholders processes and institutional developments will be an asset. Experts in Bangladesh and Cambodia will need to be engaged for 10 days; in Vietnam for 15 days, and; in Lao PDR for 7 days.

6. Responsibilities of and among the MTR team

The responsibilities of the team leader and the national experts are governed by the tasks outlined above. Under the guidance of the Team leader, the team will be responsible for:

- Developing methodology and a schedule to conduct the MTR;
- Developing the outline for the MTR report;
- Allocating specific tasks and responsibilities among the team; and
- Discussing and making specific recommendations.

The team leader is solely responsible for the final report and ensures that all parts of this ToR are covered. Should there be any disagreement between the team members, the findings and recommendations by the team leader will be treated as final. The team leader will be answerable to SNV and will work closely with SNV and all relevant parties involved in the respective Asian countries.

7. Expected output

The review shall result in a clear, well-structured and - written report in the English language (UK) of maximum 50 pages, excluding annexes, covering all the four countries and the activity on partnerships & networking. The report should contain well-founded conclusions and recommendations, with a clear time frame, and who can do what. After fieldwork, preliminary findings will be presented in a meeting with SNV staff and interested stakeholders in each country for further comments and information sharing.

8. Timeframe

The review will take place in the period June up to August and will include two missions of 14 days: One mission will cover Bangladesh and Cambodia (both 7 days), while the other one will cover Vietnam (10 days) and Lao PDR (4 days). The draft final report shall be submitted before the end of August 2008. SNV and implementing partners will provide comments on this draft report within 10 working days. The final report should be presented in digital form before 30 September 2008.

9. Services provided by SNV and/or the implementing partners

SNV and/or the implementing partners will provide logistics support and office space during the MTR. On behalf of SNV/Asia, Mr. Wim van Nes (e-mail: wvannes@snvworld.org) is available for additional information. The names of the SNV advisors and implementing agencies in the various countries are:

Country or activity	Name SNV Advisor	Implementing partner
Vietnam	Mr. Bastiaan Teune	Ministry of Agriculture & Rural Development
Cambodia	Mr. Jan Lam	Ministry of Agriculture, Forestry, & Fisheries
Bangladesh	Mr. Sundar Bajgain	Infrastructure Development Company Limited
Lao PDR	Mr. Andrew Williamson	Ministry of Agriculture & Forestry
Partnerships & networking	Mr. Wim van Nes	-

10. Terms of engagement

SNV will request a number of short-listed consultants to submit their CV, together with their daily tariffs. These CVs should include an overview of comparable studies done in the past. Based on these CVs, SNV will select the team leader and the national experts, one for each country. After reaching an agreement, SNV will present a contract to be signed with the consultants.

The international consultant will be paid from the budget for the Asia Biogas Programme or from SNV's core subsidy, while the national experts will be paid from the annual budget of the respective country programmes under the Asia Biogas Programme.

11. References

- [1] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. A proposal (draft) prepared for DGIS/DMW*. Den Haag, 22 November 2004
- [2] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Addendum to the proposal (draft) prepared for DGIS/DMW*. Den Haag, 7 April 2005
- [3] DGIS/DMW, Grant Document on the Asia Biogas Programme, dated 17 May 2005 (Reference: DMW/FK-381/05)
- [4] DGIS/DMW, Grant Document on the Asia Biogas Programme, dated 10 April 2006 (Reference: DMW/FK-308/06)
- [5] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Plan & Budget 2006*. Den Haag, January 2006
- [6] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Report 2005*. Den Haag, June 2006
- [7] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Revised Annual Plan & Budget 2006*. Den Haag, August 2006

- [8] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Plan & Budget 2007*. Den Haag, January 2007
- [9] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Report 2006*. Den Haag, May 2007
- [10] Netherlands Development Organisation, *Asia Biogas Programme: Access to sustainable energy for 1,300,000 people. Annual Plan & Budget 2008*. Den Haag, November 2007
- [11] SMW (Castro), memo to DGIS/IB (Van der Ploeg) on *Bangladesh and Cambodia Biogas Programmes*, 7 February 2006
- [12] Infrastructure Development Company Limited and Netherlands Development Organisation, *National Domestic Biogas and Manure Programme in Bangladesh. Implementation Plan*. January 2006 (final editing April 2006)
- [13] Ministry of Agriculture, Forestry and Fisheries and Netherlands Development Organisation, *National Biodigester Programme in Cambodia. Programme Arrangement and Implementation Document*. Phnom Penh, Cambodia, January 2006
- [14] SMW (Castro), memo to DGIS/IB (Van der Ploeg) on *Laos Biogas Programme*, dated 3 May 2006
- [15] Ministry of Agriculture and Forestry and Netherlands Development Organisation, *Implementation Plan for a Biogas Pilot Project (BPP) in Lao PDR (Final Draft)*. Vientiane, Lao PDR, October 2006
- [16] Biogas Project Office, *BP I Final Report. Support Project to the Biogas Programme for the Animal Husbandry Sector in some Provinces of Vietnam*. Hanoi, November 2006

This page was intentionally left blank

Annex II – Summary of answers on Networking

Workshops/meetings

Are WKSPs well organised?

I attended only two network meetings, Cambodia and Lao. Both of which I found to be extremely well organised and it was clear that great attention had been paid to the details.

Yes! All workshops are well organised and agenda, programme are well prepared in pre-consultations.

As participants/networkers we are well in advance informed about the upcoming WKSPs, the terms and conditions are clear and to the point. The programme is well balanced including an SNV internal meetings, field visit, and expert meeting.

In my view the workshops were well organised (good programmes, well prepared and good facilities).

The workshops were well organised. Increasing the duration by a day or two would be great so as to allow participants discuss issues deeper and find more effective ways forward.

I have attended three networks and biogas experts meeting; In Vietnam, Bangladesh and Cambodia. Those meetings have really busted my knowledge on household biogas as I met more experienced people. The field trips organised along with those meetings are highly relevant like the visit of biogas appliance manufacturers workshops, visit of biogas district offices; the visit of biogas families with other cultures than yours, the practical construction of plants (new designs).

Would you suggest a different approach for the WKSPs?

For me it was useful to physically see a working bio-digester as it is not an area I work in directly, however, I'm not sure it was as beneficial to the other attendees who must see them everyday.

While I do not wish the approach to be changed I do feel that in the near future the need may arise to set up a separate "initiation" version to introduce newcomers to the biogas (advisory) practice. The more experienced colleagues may not benefit from going over the same basics repeatedly.

No, both the workshop/events used to follow participatory approach including experience sharing.

In the future events, I would suggest also to involve more not-so-senior advisors, for them to get more exposure to the biogas expertise.

The concept of the WKSPs is relevant, I like to suggest that one WKSP is organised per region Asia, East and Southern Africa and West Africa in the 1st half year and that a combined WKSP meeting is organised in the 2nd half of the year. The combined WKSP could be extended with one or two days and specific training could be included in the programme to meet the demand for knowledge for 'newcomers' to the biogas sector. Experienced biogas staff could then be act as faculty.

The SWOTs should have been documented, edited and published with the proceedings.

Not really. Please continue the good work. Perhaps, there should be more days for these meetings, if at all possible and desirable.

Definitely the workshops were well structured and organised. The network meeting held in Cambodia was also well structured but I felt that there was some time constraint for enough discussions on presentations and other issues among the network members. The workshop was conducted well. Regarding the meeting and the workshop in Vientiane both were well organised and no room for comment.

Selection of participants could have been more consultative so as not to miss important participants for their contribution to the workshop or for their learning.

In fact, the approach is perfectly alright covering wide aspects and giving room to all to the extent possible. Combining field visits with presentation/discussion has been instrumental for better understanding of the subject matter. Thus I don't think any different approach will be needed.

Are the subjects that have been discussed relevant for you?

Not all subjects were relevant to me as again DTW is only responsibly for the technological input on appliances (stoves, burners, taps etc). However, I found the subjects interesting and well presented, even if not relevant to me now they may be in the future.

Yes, very much so. Only regret: time does not always allow developing the more complex or challenging ones sufficiently. Prolonging the workshops may not be the most feasible answer to that but participants might be sent back with some homework – in groups.

Yes, slurry workshop was more theoretical. As a renewable energy professional, I got an opportunity to learn slurry, its physical and chemical composition including properties.

Not all

Considering the fact that the participants of the meeting come from different backgrounds with various expertise, it is difficult for all the issues to be (equally) relevant to all. So, some issues are more relevant and some less. Nevertheless all subjects discussed are related to the “biogas sector”.

The fact of having specific subjects for each workshop, has allowed the participants to exchange and learn more from others experiences and share their own experiences. Those discussed subject were very relevant and easily applicable to our daily work (biogas plants construction and designs - Vietnam, biogas private sector development - Cambodia, quality control - Bangladesh; with field visits).

The subjects for next meeting are set as per the decision of the participants, therefore are very relevant.

The one held in Cambodia was certainly relevant. Though the one in Vientiane was not directly related, but considering the promotional aspects of the biogas programme it will be useful. For example, the workshop in Vientiane was related to ‘biogas appliances’ which is not a directly related field to me. However the opportunity to see different uses from biogas like operating a rice cooker and water heater were completely new to our context and useful to share with biogas users here for promotion. Beyond the workshops, network meetings certainly had relevance to my work.

Extremely relevant. The time I started participating in these meetings was the time of developing the implementation plan for the ---- Biogas Programme. Every of these meetings has provided new insights and ideas, always returning to the programme with full batteries and a load of lessons learned! I cannot stress enough how this experience compares to other meetings, which tend to be less pragmatic.

What other issues would you like to be considered in future events?

Possibly more presentation from people outside the biogas community, areas such as village marketing, decentralisation, how to manage QA etc are all relevant to the sector.

Research and development – which is my particular interest.

As a participant from the new biogas country, I have benefited a lot from the lessons I got at the workshop. The workshop was well organised to address issues related to biogas practice. Especially the visits made to the biogas households and the attendance during the launching of Micro Finance for biogas in Cambodia were for me eye openers. The topic selected on private sector development in the framework of national programmes on household biogas was very relevant especially for the country I represented where the private sector’s role is limited. The face to face meeting and exchange of views in the profession is very important for the development of the sector.

I appreciated the discussions with the SNV colleagues on the approach en progress of the programme and with the external experts on specific issues. I think the link with

other SNV (enterprise development), DGIS (sanitation programmes) and specific embassy programmes could get more attention. The subjects discussed like the programme management, CDM, communication and extension were very relevant.

I think all related subjects are relevant to be discussed but mainstreaming the biogas approach in laws and education could be interesting. In my view this programme should get much more attention and press. How to organise this could be a topic as well.

It would have been good if the organisers had invited some biogas owner to share how his/her life has been changed from biogas.

We may need to find and invite more experts who can share different experience. Successful project stories can be shared to the participants.

CDM, pro-poor orientation of the programmes, cost benefit analysis of cheaper designs, etc.

Issues related to bio-slurry management and utilisation, its marketing and financing, improvement of livelihood of biogas plant owners by improving their farming systems.

Success stories.

Biogas, being a multi-disciplinary subject and with fast changing scenarios, there will always be issues which would need attention from time to time. Issues need attention at present are: Improved and low-cost biogas appliances and accessories (burner, lamp, pipe line); health and environment benefits (reduction in indoor air pollution, elimination of breeding of flies and mosquitoes); R&D on reducing plant cost and Minimising programme cost and maximising services.

Carbon trading will be more useful considering the sustainability/support financing point of view. Considering price hike in the biogas plants, low cost biogas technologies will be useful to reach out to the poor families. Biogas from biomass (or biomass in combination with cattle/swine dung).

Access to electricity is vital for poverty alleviation and sustainable development in the developing countries. Dung from 2 cattle head or droppings from 100 birds (duck, hen) or night soil from 25 people can produce enough biogas to generate 1 kWh of electricity which can meet the electricity need of an average rural family in a developing country like Bangladesh. Co-operative/cluster house based small electricity generation unit may be set-up in rural areas with the above mentioned traditional raw materials along with kitchen and agricultural wastes, water hyacinth, garbage etc. In this perspective a workshop on bottle-neck in the generation of small scale electricity from biogas may be organised.

Technical back-up service and durability of appliances and accessories is a major hindrance for propagation of biogas technology. A seminar on improvement and standardisation of appliances and accessories may be organised.

Study tours

Are study tours well organised (you can if you wish specify per tour you have participated)?

Same as above: very well organised, very instructive and very enjoyable at the same time.

I participated international slurry study tour in Nepal last year. The duration of programme was short and venue was in rural part of Nepal. The tour was well organised and participants got first hand information of slurry application and its handling techniques in Nepal.

I have participated only one International Bio-slurry study tour held in Nepal and it was well organised.

The study tours are very useful for newcomers as well as experienced staff as it is a fine opportunity for a reality check. During the study tour there is good opportunity for net workers to interact, meet with the client as well to interact with programme staff of that specific country. I also consider a study tour an important tool as recognition for programme staff.

The tour was very well organised and allowed the participants to learn more on bio-slurry as experts from different countries were invited this being complimented by field visits.

Yes, the study tours are well organised. The hosts, NBP team in Cambodia and BPP team in Laos, respectively, deserves appreciation for this.

Would you suggest a different approach for the study tours? Which?

No. I have read some of the negative comments about the field trip that was part of the Cambodia workshop (November 2007) - I wholly disagree.

Duration and venue for accommodation should be carefully determined.

Present approach is fine to me.

Study tours need to be organised as per the need and follow-ups on the outcome of the tours should be well documented and shared to network members.

Has the study tour been relevant for your own professional involvement with biogas?

Yes. In the limited period, the study tours have given a fairly good idea of the biogas programmes of the respective country and the issues/challenges it faces.

Yes, absolutely and very much so.

Yes, I used to think biogas project is only for energy. I have realised the importance of energy as well as slurry. I think equal emphasis should be given for biogas and slurry promotion. Association with SNV has sensitised me on these aspects.

After I came back from it I was able to advise the biogas programme in my country on different ways of bio-slurry application, and since that time bio-slurry has been upgraded and focused on in our programme.

Yes, during every study tour one picks up new ideas or get conformation about own practises. It also underlines the issue that you are part of a wider network whereby there is an opportunity to interact with biogas users.

What is your assessment of the effectiveness of this kind of initiatives (taking into account that they are costly options)?

Study tours are useful mainly for the new persons however, strong follow-up on utilisation of the tour experience needs to be strengthened.

While expenditure is obviously considerable I think the investment value is worth it and that will remain valid for some time to come now that the initiative in African is set to gain momentum. Our partners need exposure to diverse experiences in various countries and regions in addition to exposure to technology.

I was one of the participants during the bio-slurry study tour in Nepal. Although Nepal was not at the forefront in bio-slurry utilisation, the use of bio-slurry by farmers is very impressive. Also the Knowledge I got from the experts and SNV advisors in Asian countries was quite useful. As I mentioned earlier this part of the exposure is also a very good experience for a new biogas country where I came from. It gives me a lot of scope for our planned activities in the area.

Study tours are very relevant (I attended one in China which was well organised) to get ideas and exchange views. They should be specific and well prepared by the organisers and the participants. There should be made budget available to directly support lessons learned ideas.

Not having these study would be the network activities rather abstract and then just to meet in a meeting room wherever would have little added value related to the cost incurred.

It is most effective but I have no idea about cost.

It is worth the time, effort and money. Otherwise, we risk working in isolation in this regional Asia Biogas Programme, without learning and sharing from each other.

Though they are costly, they are effective also. These tours give exposure to participants and motivate them to learn from real cases in the field.

Especially for young programmes as ours, it are real eye-openers to go and visit well established programmes. The context of biogas is sometimes hard to explain, the entire institutional setup that goes with it is enormous, to see this in practice explains more than a thousand reports.

Web site

Would a Web site for the Biogas Programme be useful for you and for the programme?

To highlight the identity of each individual national biogas programme it is recommend having a website per country. Established websites like HEDON etc could make web-links to the individual websites.

I believe such a web-site would be usual but agree there needs to be defined topics.

For me personally, I do not see an additional value for the separate website of the Asia Biogas Programme. Moreover, the country specific programmes have their own websites. Hence, I doubt the additional value of the website of Asia Biogas Programme.

SNV has definitely the most important pool of knowledge when it comes to promotion of biogas globally. A Web Site of the programme will be very useful to disseminate the information useful for programmes as well as for general public to tell the world that what is being done and what else can be done. Hosting a website does not cost much. The benefit, however small will be significant compared to the cost involved.

Naturally Website for the Biogas Programme is useful to know about the development happening in other countries and prospects for future. If any information/update required about the programme in other countries it helps a lot. For the programme also it is certainly helpful in promotion and dissemination of information about biogas to outside world including to interested people within SNV and its partners.

A website could be useful but maybe this should be done in cooperation with other biogas programmes. In my view it should be a database of best practices and a forum to present developments (not a forum for discussion).

The web site should be strengthened and kept vigil as this is the only tool of exchange of views and information, to be aware of the latest development and know the activities going on in this field worldwide.

Regarding the website, I feel that there might have been some lacking in updating it. This is however not to blame rather suggestion for improvement. The job done so far is praiseworthy. Naturally further improvement in the website will certainly add value to the users.

Experience shows that some of these sites that have been set up with the best intentions as a forum for discussions among members are not successful, there is hardly any interaction. If this is true, would such a site still be useful as a source of information both for the countries and partners involved, and for the outside world?

Indeed it would, again on a technical side it is madness that we are wasting money designing products for use in Cambodia when the products have already been designed (and paid for) elsewhere. We could save time (and SNV money) if we have full access to other countries technology and R&D via a quick reference site.

A Web site could be useful from my point of view if it sticks to simple principles: be practical and stay that way and aim at providing practical information to a limited number of people involved in the development and implementation of biogas programmes. Nothing against more comprehensive approaches, discussion for a and the like, but the experience suggests: don't mix, don't try to cater to too many different needs on the same website. Experience also suggests that it can only work if a competent and dynamic person is put in charge.

Keeping up a good (annotated) document library is a seductive feature!

A web site is really useful for information sharing and exchanges especially in Africa where household biogas is starting , the fact of no much interactions should not stop such a revolutionary tool.

Yes, we use BSP website for information related to biogas. I have once browsed Vietnam Biogas Programme and have got some information related to CDM methodology.

It is true that the website is not best utilised for discussions among SNV members. The reason is that most of the important issues are discussed through e-mails directly. The website may be useful for other persons and programmes.

If one has a specific question on biogas be it related the technology, financial aspects, etc one can contact an expert directly. Therefore it would be helpful to have an overview of who are the experts and their specific expertise.

I am not a member of the network. However, let me take the liberty to mention that motivational strategy (month-wise subject matter for discussion, answers/clarifications from a team of experts, announcement of prizes for the best question and answer,

organising competitions on best poster, manual, promotional strategy, achievement of targeted number of plants, etc.) could help in promoting the use of discussion sit

Again, there is the issue of ownership of this separate website. Who will be responsible for maintaining this centrally? I understand that this is proved to be the biggest stumbling block, so far.

Limited interaction might have happened due to time constraints as everybody is occupied with his/her own daily work giving less scope for interaction (unless required). Moreover, most of the staff, particularly advisors, is working in country and they have sufficient interactions and discussions among them and also with the partners. Nevertheless, maintaining website will certainly provide room for access to information/development in the sector. I believe this will also be helpful to partners as well besides the outside world. I therefore strongly recommend for continuation of the website, of course with update/improvement from time to time.

To my personal opinion, I feel it would be better to have an elaborate biogas section on the SNV corporate site, this to keep a clear link with SNVs expertise.

Any other comments, suggestions, etc.

Within an ever increasing biogas network there seem to be a need an annual training programme whereby newcomers, government representatives, NGOs, funders, practitioners, construction companies, etc, etc can be trained and at the same time have an opportunity for face to face networking. Such a training could be come an annual event.

I have found that in the Network meetings I have attended there seems to be no global unity with all (or nearly all) national bodies either blinkered to their own programmes or unwilling to share and open meaningful discussions with others. I feel that SNV through its technical and financial support, could play a greater role in breaking down these barriers and get real collaboration between countries. However, I'm fully aware that they are national programmes and therefore responsible for their own actions but SNV has real leverage if used positively.

Many other countries in Asia and other parts of the world are aspiring to promote biogas in their countries. SNV has to find a way to address their queries and help them find their way forward. The Web Site could be a good way to handle that without much cost. Someone sitting in a programme country can be made responsible to handle the queries on behalf of the programme, even on a part time basis.

1. A booklet on bio-slurry, encompassing the field experiences of different countries.
2. A report on work done and in progress on sanitation and environmental aspects of household biogas plants, how to maximise such benefits and future line of work.
3. A booklet on Biogas burners and lamps-Designing and manufacturing, country-wise standard specifications, maintenance and repair, etc.
4. A study report on masonry biogas plants versus industry manufactured plants (made of plastics).

A bovine epidemic erupted in the southern part of Bangladesh which caused death of hundreds of cattle head this year. The veterinary doctors and specialists ultimately diagnosed the cause as use of over dose of chemical fertiliser for rapid growth of rice which was later used as fodder. With the same cause this is equally a matter of concern in the case of continuous decline of fish fries in natural sweet water bodies in Bangladesh. More than ever, now I feel and acknowledge the importance of the "International workshop on the use of bio-slurry" which provided and allowed maximum exchange of in-depth information about the diversified multifarious benign use and significance of bio-slurry.