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# **Assessment of the Conditions for Linking Microfinance to Household Biodigester Construction in Cambodia (Final)**

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## **List of Acronyms**

ACLEDA	Association of Cambodian Local Economic Development
CEB	Cambodian Entrepreneur Building
CIDS	Cambodia Institute of Development Study
FMO	Netherlands Development Finance Company
MFI	Microfinance Institution
NBP	National Biodigester Programme
NBP	National Biodigester Programme Office
PBPO	Provincial Biodigester Programme Office
SNV	Netherlands Development Organization

## Executive Summary

### *Background*

In January 2006, the Ministry of Agriculture, Forestry and Fisheries (MAFF) and SNV agreed on the joint development of a National Biodigester Programme (NBP) as a way to create an indigenous, sustainable energy source in Cambodia and to utilize the potential of biogas in the country. The NBP aims to construct 17,500 biogas plants in 6 provinces over a period of 4 years.

As a way to help rural households finance the construction of a biodigester, the NBP, in cooperation with the FMO and a number of leading MFIs, is designing a micro-credit program specific for biodigester users. To aid FMO and SNV in developing a strategy to create a favorable financial product for rural households, the Cambodia Institute of Development Study (CIDS) was commissioned to carry out this study. The study assesses: 1) demand conditions of potential biodigester users for micro credit, 2) supply conditions of financial institutions to lend to potential biodigester users; and 3) willingness and capacity of provincial BPO to play an intermediating role.

### *Methodology*

The study comprised of a household survey, in-depth interviews with 4 leading MFIs and 1 interested NGO, and secondary desk research. A total of 283 households were interviewed, covering 11 districts in Kampong Cham (7 districts) and Svay Rieng (4 districts) provinces.

### *Demand Biodigester Market*

Among the 283 pig-raising and cattle-raising households surveyed, 96.5% have *sufficient capacity* to operate a biodigester.<sup>1</sup> The majority of these households (91% or 248 households) stated that they are interested in constructing a plant because of the increasing cost of energy (due to the growing scarcity of resources). Through extrapolation of the survey findings and secondary data, the projected biodigester market in Kampong Cham is 162,250 households and 51,276 households in Svay Rieng.

### *Demand for Micro-Credit*

The majority (84% or 209 out of 248) of households interested in a biodigester complained that they lack money to finance construction, while the remaining 16% confirmed that they are capable of financing on their own. Among the households in need of finance, only 75% (or 157 households) are willing to borrow credit. Fear of being unable to repay the loan is the primary reason why some biodigester clients refuse to borrow credit despite their need. Some clients also complained that complicated application processes deter them from applying. On a provincial level, the projected

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<sup>1</sup> Sufficient capacity is defined as households with a minimum of 18 kg of dung per day. While this is lower than the 20 kg requirement for a 4m<sup>3</sup> plant, we allowed for a lower threshold of 18 kg because changes in feeding can easily bring these households to par with the requirement. Furthermore, we also categorized households with 10 kg to less than 18 kg of daily dung as sufficient capacity if they have plans to expand their pig or cattle-rearing activities in the near future.

market size of a biodigester micro-credit is roughly 141,233 households - 102,715 in Kampong Cham and 38,518 in Svay Rieng.

Households interested in getting finance want a credit size around 400,000 riels (\$100) to less than 1,200,000 riels (\$300). According to these findings, a credit programme for biodigester clients in Kampong Cham and Svay Rieng is expected to cost around \$14 million-\$42 million for loan disbursement. The average interest rate perceived to be suitable is 1.16% per month for loans in riels. Many clients (41% of 155 households) feel that 12 months is a sufficient credit term for them to complete repayment.

### *Supply of Credit*

The Research Team consulted four leading MFIs, all of which have operations in the two provinces under study: ACLEDA, Amret, CEB, and Prasac. In addition, the team also met with HURREDO, an NGO based in Siem Reap. Although HURREDO does not have operations in the provinces studied, they expressed strong interest to provide micro-credit to biodigester users in their coverage areas. Overall, the credit providers expressed interest in lending to biodigester users but are concerned that default risk may be high because the credit is for consumption not production purposes. In addition, they mentioned that it may be a challenge to tailor a new product specific for biodigester users but are willing to discuss the issue further with the NBP and FMO.

Contrary to the concerns of MFIs about repayment risk, a biodigester credit could be seen as productive and not purely for consumption. The savings that could be gained by biodigester users in terms of money and time may increase the net incomes of borrowers and hence, increase their ability to repay the loan.<sup>2</sup>

### *An Agreeable Financial Product*

Two critical issues influence the acceptability of a financial product for borrowers and lenders: *credit conditions* and *access to credit*.

Based on survey findings, credit conditions desired by potential biodigester users are generally in line with the conditions presently offered by the four MFIs, with the exception of the level of interest rate. Potential borrowers request on average an interest rate of about 1.6% per month for loans in riels, lower than the current market rate of 2-3.5%. The rationales behind that are: 1) profit from economic activities are low, 2) economic activities prone to high uncertainties such as natural disasters and price fluctuations, 3) low living standards, and 4) possession of few fixed assets. On the side of lenders (MFIs), they respond that the interest rate they charge must cover: 1) the high costs of funds, 2) high country risk, 3) high operation costs, 4) taxes and 5) profit.

During interviews with financial institutions, it was suggested that the FMO could be a key player in helping to mediate the interest rate gap between biodigester clients and MFIs by helping to reduce the cost faced by MFIs. Some recommendations are:

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<sup>2</sup> Based on discussions during a workshop between the FMO, MFIs, NBP and CIDS on October 4, 2006.

- FMO could provide cheap funds or even grants to MFIs specifically for lending to biodigester users
- FMO could be a guarantor of default loans, agreeing to pay a certain percentage of bad loans
- FMO could offer long grace periods on loans to MFIs

Regarding access to finance, which relates to the screening and evaluation process of MFIs in approving a loan application, the PBPO could play a leading intermediary role in helping MFIs determine the creditworthiness of biodigester clients. The PBPO, given their experiences in working with and strong knowledge of the target group, are qualified to help credit providers assess the livestock activities of biodigester clients, which may help reduce the risk of credit default. In addition, PBPO could help lower the probability of default by facilitating veterinarian services and pig-raisers.

#### *Roll Out Strategy*

A programme to link potential biodigester users with micro-credit will likely encounter many location-specific and economic challenges. The general context of rural people can be summarized into three points:

- Negative perception and distrust of financial institutions
- General resistance to change and new technology
- High default risk due to poor financial discipline of borrowers and uncertainties related to business activity

To overcome these challenges and ensure the success and sustainability of the program, the Research Team suggests a three-phase rolling out strategy. In the Pre-Roll Out Phase (Phase 1), efforts may need to focus on mass information dissemination and public awareness campaigns on the advantages, usage and safety of a biodigester. These efforts should be conducted in a visual and practical way to build confidence of potential biodigester users to try a new technology. In the Roll Out Phase (Phase 2), efforts may need to concentrate on identifying strategic locations and clients that could serve as *first movers* and create a large demonstration effect. This can be assisted by the PBPO given their strong local and technical knowledge. At this stage, marketing campaigns on a biodigester micro-credit may be useful. In the Aftercare Phase (Phase 3), the NBP along with the PBPO and construction companies may need to work together to ensure that all biodigesters operate at maximum efficiency by providing maintenance and/or technical advice to users.

These steps could help increase the trust of potential biodigester clients in adopting new technology and ideas, which is critical for the long term success, sustainability and scale-up of the biodigester programme.

## 1. Background

In January 2006, the Ministry of Agriculture, Forestry and Fisheries (MAFF) and SNV agreed on the joint development of a domestic biodigester programme as a way to create an indigenous, sustainable energy source in Cambodia and to utilize the potential of biogas in the country. The objective of the programme is to promote mass dissemination of domestic biogas plants through the development of a commercial, market oriented, biodigester sector, with emphasis on stimulating consumer demand for domestic biogas plants. Current plans are to construct 17,500 biogas plants in 6 provinces over a period of 4 years.

Access to financial recourses is one critical factor influencing the decision of households to purchase a biogas plant. At present, existing MFIs do not provide consumption credit. Consequently, this could hinder potential biodigester users from constructing a plant. In cognizant of this, FMO and SNV had a meeting on December 13, 2005 to discuss the biogas programme and the possibility to link finance to biogas users. FMO expressed interest to possibly finance interested financial institutions which, in turn, would finance either the biogas-end-users or the biogas plant constructors.

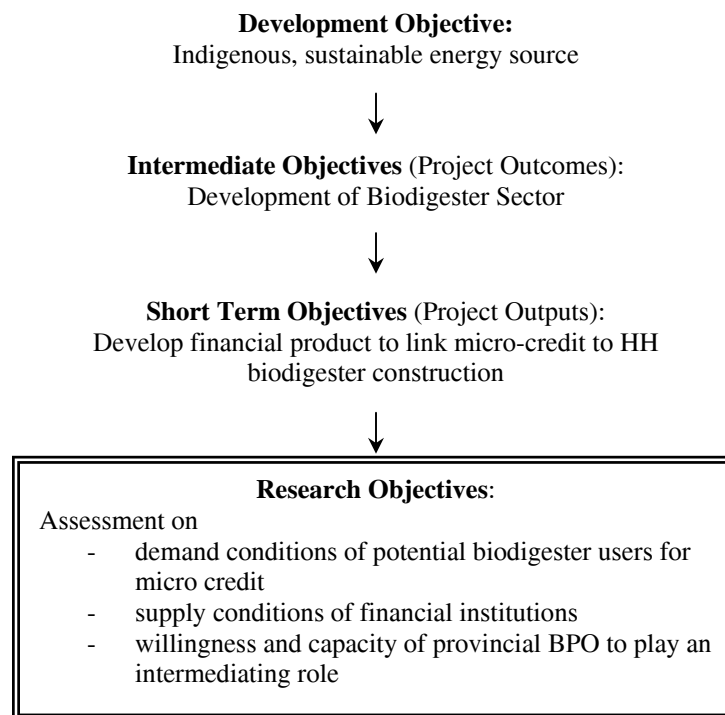
To aid FMO and SNV in developing a strategy to create a favorable financial product for households, this particular study was commissioned to the Cambodia Institute of Development Study (CIDS) to assess the opportunities of providing micro credit to potential biodigester users.

### 1.1. Objectives of the Study

This study is one small component of a larger project framework, and is meant to be an input to enhance the effectiveness of project activities and leverage for achieving certain objectives. Thus, to be consistent with the framework, it is important to understand from the onset the hierarchy of objectives linking this study to the project outputs, outcomes and eventually long term development objectives. Figure 1 provides an illustration of the hierarchy of objectives, which is based on the TOR and related documents provided by the National Biodigester Programme.

Following along the chain of objectives, the **research objectives** of this specific study is to assess the 1) demand conditions of potential biodigester users for micro credit; 2) supply conditions of financial institutions to lend to potential biodigester users or intermediating organizations; and 3) willingness and capacity of provincial BPO to play an intermediating role.

**Figure 1: Hierarchy of Objectives**



## 1.2. Methodology

### 1.2.1. Approach in Collecting Information

Different tools were employed to collect specific information from different target groups. The main target groups were households, financial institutions (specifically MFIs), and provincial biodigester programme officers.

Structured questionnaires were used to obtain information from *households* that are potential biogas users. In order to qualify as a potential biogas user, households must own at least 5 pigs or 2 cattle which are capable of producing a minimum of 20 kg of dung per day. The questionnaire sought to get answers on the socio-economic status of households, number of pigs/cattle, interest in the construction of a plant, demand for micro-credit, credit conditions desired and repayment capabilities (questionnaire attached as Appendix 1).

A total of 283 households were interviewed, covering 11 districts in Kampong Cham (7 districts) and Svay Rieng (4 districts) provinces. Districts were selected based on the existence of MFI operators in the area and the clustering of pig and cattle-rearing. Table 1 sorts the number of household interviews by district. Households were selected based on the recommendations of PBPO officers, local veterinarians and village chiefs. Some

households were selected during random walks in the village and from recommendations of other interviewees (“snowballing” method).

**Table 1: Number of Household Interviews by District**

Districts	# of HH	%
Batheay	23	8.13%
Chamkar Leu	24	8.48%
Cheung Prey	40	14.13%
Kampong Siem	21	7.42%
Kang Meas	15	5.30%
Prey Chhor	30	10.60%
Romdoul	7	2.47%
Svay Chrum	41	14.49%
Svay Rieng	11	3.89%
Tboung Khmum	52	18.37%
Svay Teab	19	6.71%
Total	283	100.00%

Note: The sample size of interviewees per district was determined based on population weights.

Semi-structured interview guidelines were used for interviewing *financial institutions* (see Appendix 2). These guidelines sought to understand the profile of the MFI, perception on rural clients, lending schemes and conditions, and interest in the biogas project. Four leading credit providers, who have operations in the target areas, were consulted: ACLEDA, Amret, Prasac and the Cambodian Entrepreneur Building (CEB). The NGO HURREDO was also interviewed based on suggestions from the NBP.

Similarly, interview guidelines (provided in Appendix 3) were employed during interviews with officers at the provincial BPO in order to get feedback on their capacity and interest to serve as an intermediary for a credit programme specific for biodigester users.

### 1.2.2. Research Team Composition

The Research Team was led by Dr. Kang Chandararot, economist and director of CIDS. Dr. Kang coordinated and supervised all the activities of the study from the proposal to fieldwork, data analysis and report writing. Team members include:

- Ms. Liv Dannel, Ph.D. Candidate, Researcher
- Mr. In Chanthol, BA, Operations Manager
- Mr. Koy Sokharath, MSc., Jr. Researcher
- Mr. Heng Sovichea, BA, Jr. Researcher
- Mr. Ung Chamna, BA, Field Coordinator
- Mr. Mann Roath, BA, Field Coordinator

Five experienced, external enumerators were hired to conduct the interviews. The survey took 6 days to complete and required a total of 336 person-hours.

## 2. Demand for Credit

### 2.1. Potential Market for Biogas Plants

Survey findings provide us with a foundation for estimating the potential market for biogas plants in Kampong Cham and Svay Rieng provinces (Figure 2).

**Table 2: Number of Pigs**

Number of pigs	# of HH	% of HH	Total # of Pigs
0 pigs	2	0.71%	0
Less than 5 pigs	53	18.73%	175
5 pigs < 10 pigs	103	36.40%	673
10 pigs < 20 pigs	82	28.98%	1,101
20 and +	43	15.19%	1,199
Total	283	100.00%	3,148

For the most part, households surveyed qualify for a biodigester. The majority of households (80.5% of 283 interviewees) have five or more pigs, and 41% have at least 2 cows. Table 2 and Table 3 summarize pigs and cattle figures for the households surveyed.

**Table 3: Number of Cows**

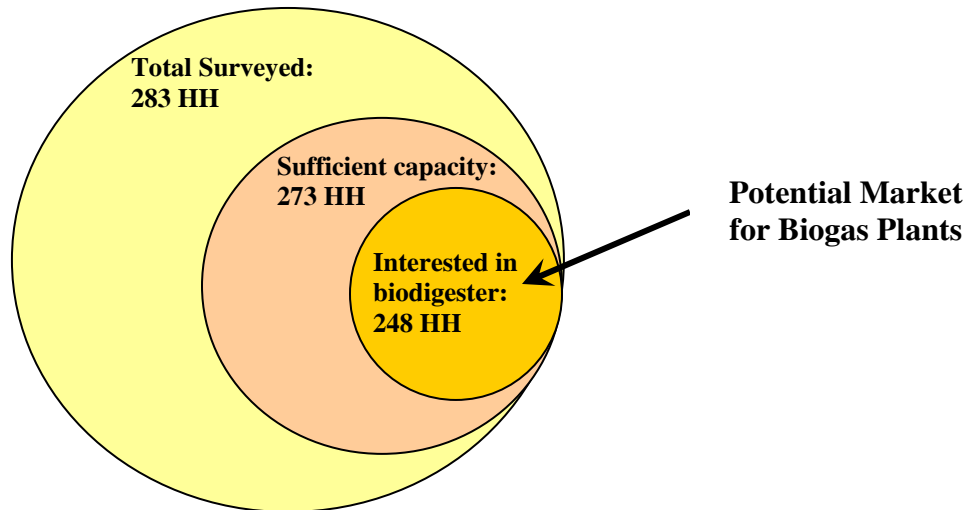
Number of Cows	# of HH	% of HH	Total Cows
0 cow	148	52.30%	0
1 cow	17	6.01%	17
2 cows	22	7.77%	44
> 2 cows	96	33.92%	492
Total	283	100.00%	553

Among the total 283 households interviewed, 273 (96.5%) have *sufficient capacity* to operate a biodigester. Our definition of sufficient capacity is households with a minimum of 18 kg of dung per day. While this is lower than the 20 kg requirement for a 4m<sup>3</sup> plant, we allowed for a lower threshold of 18 kg because changes in feeding can easily bring these households to par with the requirement. Furthermore, we also categorized households with 10 kg to less than 18 kg of daily dung as sufficient capacity if they have plans to expand their pig or cattle-rearing activities in the near future.

To determine the *effective demand for biogas plants*, we extracted households with interest to construct a biodigester from those with sufficient capacity. The outcome is 248 households, 91% of those with enough capacity. The potential size of a biogas market, based on the level of interest, is higher in Svay Rieng than Kampong Cham; 95% of households with sufficient capacity in Svay Rieng want to construct a plant, compared to 89% in Kampong Cham. Lower living standards and higher scarcity of energy sources

are two likely reasons behind the stronger interest for a biodigester in Svay Rieng. There does not appear to be a significant correlation between the livestock size and interest for a biodigester.

**Figure 2: Potential Market for Biogas Plants among Households Surveyed**



Based the survey findings and secondary data, we can extrapolate the potential size of the biogas plant market in Kampong Cham and Svay Rieng provinces. We employed an inductive methodology to estimate the number of households that will likely be interested in constructing a biodigester. Firstly, we started with the number of households in the two provinces, available from the Ministry of Planning’s population census. Secondly, we estimated the number of households raising livestock (pig and cattle) with the assumption that roughly 60% of households carry out livestock activities.<sup>3</sup> From this, we calculated the number of households likely to have sufficient resources to operate a biodigester based on our survey findings (rate of households with sufficient capacity = 96.5%). Lastly, we used the rate of households likely to be interested in building a plant (90.8%), also from our survey findings, to determine the market size. Our calculation estimates a biogas plant market size totaling 213,527 households in Kampong Cham and Svay Rieng. Table 4 shows each step of our methodology.

<sup>3</sup> This assumption is based on fieldwork experience and qualitative interviews with local people. Also, the assumption is based on a recent baseline survey conducted by CIDS in early 2006 on pig-raising activities for a USAID project.

**Table 4: Biodigester Market for Kampong Cham and Svay Rieng Provinces**

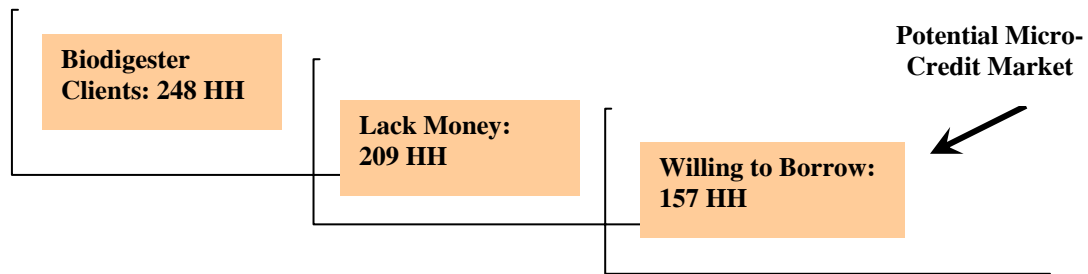
Estimates	Rates	Kampong Cham	Svay Rieng	Total
Total number of HH*		308,582.00	97,521.00	406,103.00
HH raising livestock	60%	185,149.20	58,512.60	243,661.80
With sufficient capacity	96.5%	178,606.83	56,445.02	235,051.84
HH interested in plant	90.8%	162,250.89	51,276.06	<b>213,526.95</b>

\* Based on Ministry of Planning’s Population Census Statistics

## 2.2. Size of Credit Demand

The majority of households with sufficient capacity and interest to construct a biodigester (henceforth referred to as “biodigester clients”), 84% (or 209) of 248 biodigester clients, stated that they lack money to finance construction, while the remaining 16% confirmed that they are capable of financing on their own. Of the 209 biodigester clients in need of money, only 75% (157 households) are potentially willing to borrow credit. Fear of being unable to repay the loan is the primary reason why some biodigester clients refuse to borrow credit despite their need. Some clients also complained that complicated application processes deter them from applying. Figure 3 illustrates the potential micro-credit market for biodigester clients.

**Figure 3: Potential Micro-Credit Market among Households Surveyed**



Employing a similar inductive methodology as in our estimation for the biodigester market, the approximate size of a micro-credit market among biodigester clients in Kampong Cham and Svay Rieng provinces is roughly 141,234 households. Table 5 illustrates the steps we used for our assessment.

**Table 5: Micro-Credit Market among Biodigester Clients in Kampong Cham and Svay Rieng Provinces**

Estimates	Rates	Kampong Cham	Svay Rieng	Total
Potential Biodigester Market		162,250.89	51,276.06	213,526.95
Lack money	84.3%	136,735.63	43,212.49	179,948.11
Willing to borrow (Potential credit demand)	75.1%	102,715.28	38,518.38	<b>141,233.66</b>

### 2.3. Credit Conditions Desired

Overall, most households that are willing to take out a bank loan to build a biodigester are interested in borrowing from the range of 400,000 riels to less than 1,200,000 riels (\$100 – less than \$300). The average interest rate that they perceive is suitable is 1.16% per month in riels. Biodigester clients in Kampong Cham are willing to accept a slightly higher interest rate than in Svay Rieng, 1.20% compared to 1.12%. Many clients (41% of 155 households<sup>4</sup>) feel that 12 months is a sufficient credit term (length of borrowing) for them to complete repayment. Some clients (27.7%) want a credit term between 3 months to less than 6 months. Table 6 and Table 7 present findings on loan size and credit term.

**Table 6: Loan Size (% of HH)**

Amount (riel)	Amount (\$)	KC	SR	Total
Less than 400,000	less than \$100	4.35%	2.17%	3.87%
400,000 < 800,000	\$100 < \$200	29.57%	28.26%	29.68%
800,000 < 1,200,000	\$200 < \$300	35.65%	26.09%	31.61%
1,200,000 < 1,600,000	\$300 < \$400	7.83%	21.74%	11.61%
1,600,000 < 2,000,000	\$400 < \$500	3.48%	0.00%	2.58%
2,000,000 < 2,400,000	\$500 < \$600	4.35%	10.87%	6.45%
2,400,000 < 4,000,000	\$600 < \$1,000	2.61%	2.17%	2.58%
4,000,000 and +	\$1000 and +	12.17%	8.70%	11.61%
Total		100.00%	100.00%	100.00%

Households with different sizes of livestock-raising activities (which we look primarily at pig-raising) are willing to accept different credit conditions. Households with more than 10 pigs are interested in loans exceeding \$500 to use for constructing a biogas plant and for expanding their pig-raising activities (i.e. buying more pigs and for working capital). Generally, households with this size want to schedule payments for the principle at the end of the credit term (at maturity), while they are ready to make interest payments on a monthly basis. Some households would like the option of repaying the principle at any time during the credit duration (for example, 6 months after disbursement). In return for such credit conditions, households are ready to provide collateral. Households expressed

<sup>4</sup> Two households did not provide answers.

that they want the collection or payment day to be flexible, in which payments can be made late by a few days, because they may encounter cash flow shortages. Regarding the interest rate, it is expected to not be higher than the level charged by the existing credit institutions, and preferably around 1% per month. As of the currency, households feel indifferent to whether credit is provided in dollars or riels.

**Table 7: Credit Term**

<b>Credit Term</b>	<b># of HH</b>	<b>%</b>
< 3 months	9	5.81%
3 months to < 6 months	43	27.74%
6 months to < 12 months	24	15.48%
12 months	64	41.29%
More than 12 months <= 24 months	6	3.87%
> 24 months	9	5.81%
Total	155	100.00%

Households with 6-10 pigs expect similar credit schemes as households with more than 10 pigs. Most would like to borrow credit around \$500. Smaller pig-raisers (households with 3-5 pigs) desire loans within the range needed to build a biogas plant (roughly \$200-\$300), and not more, because they are unsure of their ability to repay the loan. Additionally, they would like to keep the credit size small (that which is within their ability to pay) because of fear of losing their land (collateral) in the event of default.

According to these findings, a credit programme for biodigester clients in Kampong Cham and Svay Rieng is expected to cost around \$14 million-\$42 million for loan disbursement.

#### 2.4. Repayment Sources and Risk

Biodigester clients interested in taking out a bank loan stated that they plan to use their profit from economic activities to make repayment.

In Kampong Cham, most pig-raisers have diversified income sources ranging from agricultural activities to businesses and services. This will enable them to meet monthly interest payments as well as provide payments on the principle regardless of the payment scheduling type (monthly principle and interest payments together, or just interest payments). Despite this, credit risk still remains. Households may face late payments or even default because their diversified economic activities often create cash-flow problems which can easily affect the discipline of repayment.

The situation in Svay Rieng looks a lot different than in Kampong Cham. Potential credit clients are generally just farmers, producing rice paddy and raising livestock. Consequently, the ability to repay debt will depend primarily on profits from these farm activities. The risk of insufficient earnings is relatively high, due to two reasons. First, animal-raising in Svay Rieng is extremely vulnerable to disease because the region is

mainly low land<sup>5</sup>. Consequently, farmers are forced to sell their livestock (pigs, cattle, buffalos, etc.) before plan and at lower than expected prices due to animal illnesses. Many farmers have encountered losses, while some are able to gain only a small profit. Local veterinarian services are currently insufficient and ineffective to curb this problem. On the other hand, farmers are not inclined to get vaccination for their livestock because it is expensive. Farmers would rather sell their animals if it catches a disease, rather than prevent the disease with vaccination. Second, paddy production in this region, to a great extent, has suffered from natural disasters such as drought. Furthermore, the soil quality in Svay Rieng is relatively low, resulting in high production costs due to the need to buy Vietnam-imported fertilizers<sup>6</sup>. Consequently, farmers make thin profit and in many cases, encounter losses from their paddy production activities. The relatively high vulnerability to disease and natural disaster plus undiversified income sources indicates high repayment risk.

In sum, quantitative and qualitative information suggests that credit risk is lower in Kampong Cham, where risk is mainly in the form of late monthly interest payments, than in Svay Rieng, where there is high risk in terms of both interest payments and principle payments.

### **3. Supply of Credit**

The Research Team consulted four leading MFIs, all of which have operations in the two provinces under study: ACLEDA, Amret, CEB, and Prasac. The purpose of the interviews was to assess the interest and willingness of these MFIs to develop financial products favorable for potential biodigester clients. In addition, the team also met with HURREDO, an NGO based in Siem Reap. Although HURREDO does not have operations in the provinces under studied, they expressed strong interest to provide micro-credit to biodigester users in their coverage areas. This chapter provides a brief overview of these institutions, their existing credit schemes and conditions, and their interest as well as expectations in the biodigester programme.

#### **3.1. Profile of Micro-Credit Providers in the Targeted Areas**

##### ***ACLEDA***

ACLEDA began credit operations in Kampong Cham in 1994. To date, ACLEDA has branches in 16 districts covering 173 communes and 1,800 villages. Loan outstanding in Kampong Cham is \$9,500,000. Operations in Svay Rieng were opened in 2000, and now span 4 districts, 79 communes, and 454 villages with outstanding loan of \$2,100,000. Total clients in Kampong Cham have reached 14,824 people and in Svay Rieng, 3,523 people.

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<sup>5</sup> Based on in-depth interview with local veterinarians.

<sup>6</sup> Based on in-depth interview with farmers and village chiefs.

### *AMRET*

Since 2000, Amret has been actively providing credit in Kampong Cham. Its operations to date cover 10 districts, 41 communes and 187 villages, with a total of 9,177 clients. In Svay Rieng, Amret just recent opened a branch that oversees 1 district, 7 communes, and 32 villages. At present, Amret has 1,297 clients in Svay Rieng. Loan outstanding in Kampong Cham is 4,053 million riels and 370 million riels in Svay Rieng.

### *CEB*

CEB set up operations in Kampong Cham in 2004 to provide micro-credit to low income women. Its activities so far encompass 10 districts, reaching more than 1,200 clients and with outstanding loan of about 3,424 million riels. CEB does not have an office in Svay Rieng.

### *HURREDO*

HURREDO or the Human Resource and Rural Economic Development Organisation is a Cambodian non-governmental, non-profit, non-political organization established by a group of Cambodian agriculture and rural development specialists in January 1999 and officially registered and recognized on January 19, 2000. The organization has worked in many fields ranging from integrated farming techniques, development of small infrastructure/irrigation systems, capacity building, and agriculture/horticulture production. Its operations to date includes 8 districts, 8 communes and 44 villages in the province of Siem Reap, and have reached out to 7,140 people (4,284 are women).

At present, HURREDO is developing a micro-credit programme, which will be implemented in its coverage areas. HURREDO plans to assist 1,500 families in creating Village Credit Associations (VCA). The project will begin with promotion of saving activities. The idea is to encourage saving groups to devote 100 riels each day for saving. After gaining experiences and trust with the small saving groups, HURREDO will then encourage the group to structure as an association (VCA). Two staff will work closely with the VCA's committee to provide advice as well as to monitor and evaluate the development of the project.

Every member of the association will be required to buy shares in the association. The fee is 20,000 riels (or \$5) per member, which will be used as the association's start-up capital. Policies and internal regulations to govern the association will be formulated through a collective manner. Members will be allowed to borrow credit for various purposes, such as to construct a biogas plant. HURREDO has sent a proposal to the NPBO for a 3 year-project to extend micro-credit for building biodigesters in Siem Reap province, which sets a target of 3,010 biodigesters by the end of 2009.

### *PRASAC*

Prasac has been working in Kampong Cham and Svay Rieng since 1995. It has 15 branch districts that cover 138 communes and 875 villages. Loan outstanding in Kampong Cham alone is 8,490.68 million riels. In Svay Rieng, Prasac covers 7 districts, 62 communes, and 231 villages with loan outstanding of 1,297.36 million riels. The total number of clients in Kampong Cham is 15,014 people and 8,538 people in Svay Rieng.

### 3.2. Lending Schemes and Credit Conditions

Overall, the four financial institutions under review have similar lending schemes and credit conditions. All of these MFIs provide two main types of credit: group loan and individual loan. Group loans are targeted to clients without or lacking collateral (except in the case of CEB, which requires collateral). The concept is that these peer-controlled credit groups could help reduce repayment risk for those who cannot or do not want to provide collateral. Individual loans, on the other hand, require collateral (usually land or house plots), legal documents on the business, and sometimes a guarantor (co-signer). Group loans are usually smaller in size than individual loans. Each MFI sets different ranges (see Appendix 4 for details on credit conditions offered by the four MFIs).

Interest rates on both group and individual loans are comparable among the four MFIs, roughly around 2-3.5% per month for loans in riels. The credit terms available vary but are all within the same ballpark. ACLEDA offers loans from 6 months to 48 months. Amret has a scheduling period of 12 months. Prasac gives 12 months terms for group loans, and 24 months for individual loans depending on the type of business. CEB sets a maximum of 18 months.

Commonly, the four MFIs request repayment of both interest and principle on a monthly basis in order to increase the discipline of their clients, reducing credit risk. However, some of the financial institutions also offer other repayment options to suit their clients. For instance, ACLEDA and Amret allow clients to hold off the principle payment until the end of the credit term, when necessary. ACLEDA also gives their clients the option of paying seasonally.

### 3.3. Application and Loan Evaluation Procedures

The application and loan evaluation procedures are similar among the four MFIs in this study. Loan applications can be picked up at any branch offices free of charge. Most of these MFIs, such as Amret, CEB and Prasac have services in which their credit agents come directly to the potential borrower's house and help fill in the forms. Complete forms can be returned to the branch offices or to the credit agent.

Application forms for these MFIs follow the same structure, asking questions that pertain to the background of the applicant (name, address, telephone...), purpose of borrowing, credit conditions requested (loan size, term), assets, and income. Applicants are asked to attach documents such as a copy of family books, land plot, ID card and patent certificates (for businesses). These forms do not require the signatures of authorities.

The applications are then usually reviewed by credit officers first and then transferred to a higher authority like the branch manger (CEB and Prasac) or a committee (Amret). In reviewing loan applications for approval, MFIs put weight on the capacity of the borrower to repay the loan, character, health, and assets. According to qualitative

interviews with managers at the four leading MFIs, all reported a high approval rate – about 80-90 applications are approved out of 100 applications received.

### 3.4. Interest in the Project

This section is based on the immediate feedbacks of key operating staff at the four MFIs and may not necessarily reflect the final decision of the company since the policies and strategies of MFIs are determined by its Board of Directors. The success of bringing the supply of credit to biodigester clients will in the end depend on the strategic negotiations between FMO, NPB and the decision-makers of the MFIs.

#### *ACLEDA*

During the interview, Mr. In Siphan stated that ACLEDA is open to all clients if they apply, and would not offer special agreements or credit condition to biogas users but would consider them as normal clients. ACLEDA sees the role of the FMO as an intermediary to explain to biodigester clients the advantages of a biogas plant and to encourage them to go apply for credit at an MFI.

#### *AMRET*

Mr. Dinn Dos, Operation Manager at Amret, expressed interest in providing credit to people for the construction of biogas plants. However, Amret will have to carefully assess the risk before any credit provision particularly because the credit is borrowed for consumption and will not lead to any profit. Amret will have to review the economic conditions and activities of the household. Amret will seriously consider developing a specific product for biodigester clients if the programme implementers can help reduce risk and provide guarantee. Without such help, Amret may not be able to arrange special conditions for biodigester users, but would treat them as any other client.

For Amret, Mr. Dos stated that the FMO can play a vital role to help lower repayment risk, for instance, by guaranteeing that they will pay 50% of the principle for any default. Another possible strategy to reduce default risk is for the FMO to provide the subsidy of \$100 after biodigester clients have completed repayment. In addition, the FMO could follow up to make sure on the use of the biodigester and the techniques of pig-raising.

#### *CEB*

According to Mr. Ly Sokheit, CEB is interested in providing micro-credit to biogas plant users, but will need to take into consideration the business activities of the client before approving credit because investment in a biodigester itself does not generate any profit. CEB will likely treat biodigester clients as any other clients. However, CEB may be willing to set up special credit conditions after discussions and negotiations with the programme implementers. For this project, CEB thinks that the FMO could play a role in explaining the advantages of a biodigester and micro-credit.

#### *HURREDO*

Mr. Ngin Bunrith, Director of HURREDO, reconfirmed his strong interest to lend micro-credit for the construction of biodigesters. As noted above, his organization has sent a

proposal to the SNV-NPBO to start a credit line specifically for building biogas plants. While HURREDO does not have much experience in credit provision, it has worked closely with villagers in other areas such as agriculture techniques and horticulture production.

#### *PRASAC*

Mr. Oum Sam Oeun expressed that Prasac would be interested in providing credit to biodigester users. It, however, does not have any specific credit conditions to offer and will treat biodigester clients the same as other clients.

### 3.5. Major concerns of MFIs

Consumption credit is a new type of product for MFIs, who generally provide only production credit. This may be a challenge for the biodigester credit programme because the purpose is to channel money to households for constructing a biogas plant mainly for household usage. From a banking perspective, production credit is less risky than consumption credit. The assumption is that investment in economic activities (the business) will in itself generate sufficient profit to cover the money borrowed plus its interest. In other words, the use of the credit is focused on the source of repayment. Consumption credit, on the other hand, is spent on goods or services for personal use and not for increasing the ability of the client to repay the debt. MFIs interviewed expressed their concerns that this situation may increase the chances of default.

However, if we take into consideration the savings from switching energy sources<sup>7</sup>, which would be passed on to the biodigester user, *investment in a biogas plant can be viewed as productive and not purely for consumption*. The monetary and time savings that would be gained by the biodigester user, contrary to the fears of MFIs, could actually increase the ability of the borrower to repay the debt.<sup>8</sup>

## 4. An Agreeable Financial Product

In the previous chapters, we explored the demand and supply situation separately. Using survey findings, Chapter 2 estimated the potential size of credit demand and the loan conditions desired by biodigester clients. Chapter 3 examined the perspectives of the supply side based on interviews with some leading financial institutions, and reviews issues such as existing loan conditions, application procedures, evaluation process and interest in the project. This chapter will consider possible strategies on how to bring demand and supply together to create an agreeable financial product for both sides.

**The key issues to consider when facilitating linkage between credit demand and supply are: 1) credit conditions (the core of the product), and 2) access to credit** in terms of the procedures for evaluating an application. The first vital step in linking

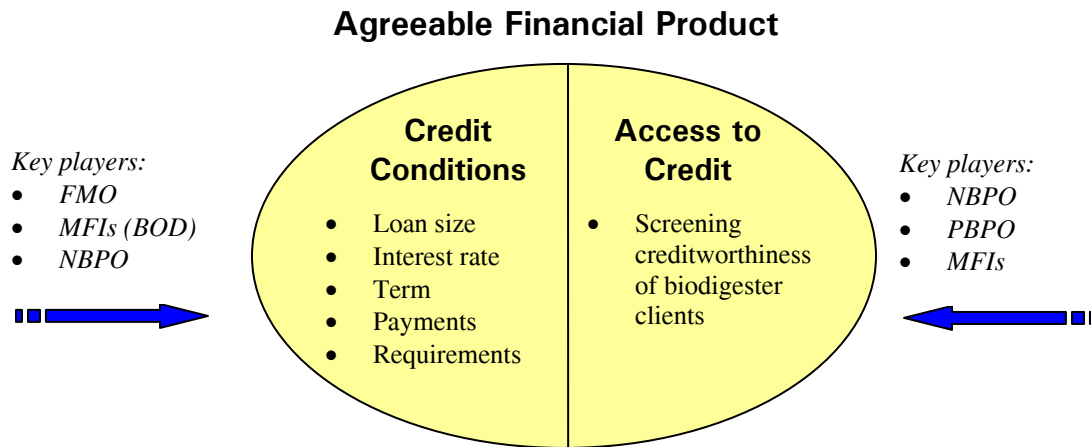
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<sup>7</sup> For instance, households will have more net income by eliminating or reducing costs related to gasoline, rubberwood, etc. The NBP estimates an annual savings of around \$90 per household.

<sup>8</sup> This issue was discussed in a workshop on October 4, 2006 between the FMO, MFIs, NBP and CIDS, which was well-received by the leading financial institutions. The workshop was held at the NBP office, Phnom Penh, Cambodia.

biodigester clients with micro-credit is to achieve agreeable credit conditions, which is needed to encourage biodigester clients to apply for a loan. The second decisive step is to help MFIs in assessing the creditworthiness of biodigesters clients and to ensure that good borrowers are approved. (Figure 4)

**Figure 4: Elements of an Agreeable Financial Product**



*Credit Conditions*

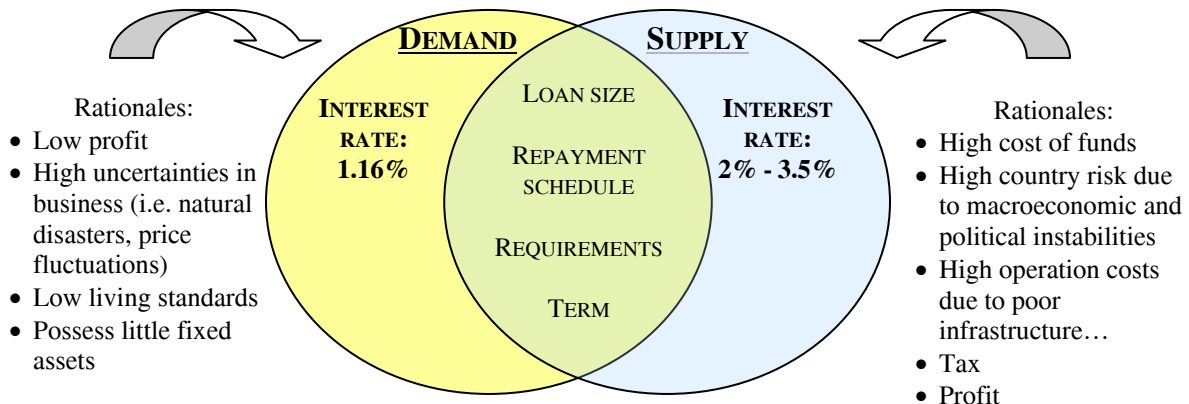
Our findings indicate that there are strong common grounds between the credit conditions demanded by biodigester clients and those currently offered by the leading MFIs. As illustrated in Table 8 and depicted in Figure 5, credit conditions related to the loan size, credit term, repayment schedule and requirements deemed acceptable by biodigester clients are currently offered by the major MFIs.

**Table 8: Credit Conditions Demanded and Supplied**

Credit Conditions	Demand	Supply
Loan size	400,000 riels to < 1,200,000 riels (\$100 to < \$300)	500,000 riels to 30 million riels (\$125 to \$7,500)
Interest rate, monthly, riel	1.16%	2% - 3.5%
Credit term	12 months	12 months
Repayment schedule	Monthly interest payments, principle at maturity	<ul style="list-style-type: none"> <li>• Monthly interest and principal payments</li> <li>• Monthly interest payments, principal at maturity</li> </ul>
Requirements	House or land plot	House or land plot (mainly for individual credit)

The major gap between the interests of borrowers and lenders is the interest rate. On the side of borrowers, an interest rate around 1.16% per month for loans in riel is perceived to be a suitable price. The current interest rate in the micro-finance market for loans in riel is about 2%-3.5% per month. While borrowers and lenders have their own rationales on what is an appropriate interest rate, they all share one thing in common: fear of risk.

**Figure 5: Micro-Credit Demand and Supply vs. Credit Conditions**



Biodigester clients, as the borrowers, want lower interest rates because their economic activities, which are mainly agricultural, are exposed to a number of high uncertainties. First, their economic activities generally yield little profit or earnings, primarily because it is very small-scale and mostly for subsistence. In economic terms, borrowers will only borrow if their profits can sufficiently cover the interest on credit. Additionally, risks related to the business such as natural disasters, diseases, and price fluctuations means that profit is not only small but highly uncertain. Furthermore, since rural people have low living standards, this means that it takes a long time for them to accumulate fixed assets, which is also indicative in their possession of few assets. Because of this, rural people fear borrowing credit that requires them to put their few assets (collateral) at risk.

MFIs, in order to be a self-sustaining business, want an interest rate that will cover their operation costs, risks, tax and profit. For one, all MFIs borrow funds from external sources (i.e. investors and banks oversea) with interest. The cost of funds imposed by investors is generally high due to factors such as high country risk associated with macroeconomic (i.e. exchange rate fluctuations) and political instabilities. On top of high cost of funds, MFIs also have high operation costs related to poor road infrastructure, staff, administration... simply because they work primarily in remote provincial areas. And as with any business, MFIs must request an interest rate that incorporates profit and covers tax expenses. According to recent financial statements of these MFIs, the composition of the interest rate is roughly: 45% to operating costs, 16% to cost of funds, 24% to profit and 7% to tax.

What leverage does the programme have in reducing the interest rate to a level that is favorable for both borrowers and lenders? Some situations such as low and uncertain economic profit of biodigester clients, poor macroeconomic situation and political instabilities are clearly outside the control of project implementers.

**Figure 6: Optimal Biodigester Credit**

<b>Biodigester Credit (Optimal)</b>
<i>Loan size:</i> 400,000 – 24,000,000 riels \$100 - \$600
<i>Interest rate:</i> 1.16% per month (riel)
<i>Term:</i> 6 months – 12 months
<i>Repayment Schedule:</i> Flexible
<i>Collateral:</i> None

The FMO could be a key player in helping to mediate the interest rate gap between biodigester clients and MFIs by helping to reduce the cost faced by MFIs. Some recommendations are:

- FMO could provide cheap funds or even grants to MFIs specifically for lending to biodigester users
- FMO could be a guarantor of default loans, agreeing to pay a certain percentage of bad loans
- FMO could offer long grace periods on loans to MFIs

All of this will depend on the negotiations between the FMO and the Board of Directors of selected MFIs, who are the final decision-makers of MFIs on interest rate policy. The optimal biodigester credit is illustrated in Figure 6.

#### *Access to Credit*

For the second step, **the PBPO could play a leading intermediary role in helping MFIs determine the creditworthiness of biodigester clients.** Since the programme aims to provide consumption credit for the construction of biogas plants and not production credit, MFIs may be reluctant to lend. The PBPO, with their experiences with working with and strong knowledge of the target group, are qualified to help credit providers assess the pig-raising activities of biodigester clients, which may help reduce the risk of credit default. In addition, PBPO could help lower the probability of default by facilitating veterinarian services and pig-raisers. From our field visits, the PBPO in Kampong Cham and Svay Rieng expressed strong interest help facilitate the successful and effective flow of credit from credit providers to targeted biodigester users.

### **5. Strategy for Rolling Out the Biodigester Credit Programme**

Following from the development of an agreeable financial product, project implementers need to consider how and where to roll out the new product in order to create maximum demonstration effects among the target group. In order to formulate an effective strategy, we must first consider the possible challenges in implementing a credit programme in rural areas, which could undermine the success of the project. This chapter begins by investigating the challenges and possible solutions, and will end with a recommended roll out strategy as well as criteria for identifying the optimal pilot locations and clients.

*Challenge 1: Rural households generally have a negative image of financial institutions, especially in poor areas such as Svay Rieng.* Rural people perceive MFIs to be solely profit-oriented businesses that try to cheat them into losing their land.

Possible solution: In order to build trust between biodigester clients and credit providers a critical success factor is the existence of **first movers** – individuals who are willing to take on risk and try something new, who could serve as role models to give confidence to other villagers to borrow. Project implementers, especially the PBPO because of their close interaction with and proximity to biodigester users, should be keen in identifying and promoting people with the ability to motivate other locals.

*Challenge 2: Rural people are afraid to try new things, especially those that require a lot of money, such as the construction of a biogas plant.*

Possible solution: An advantage for the biodigester programme is the growing scarcity of energy sources, which is creating pressure for rural people to find alternative means. While the survey findings show that the majority of pig/cattle-raisers interviewed are very interested in the construction of a biodigester, most of these people also emphasized that they would like to see a biogas plant in person first before making any investment. Many people also mention though the idea of a biodigester is interesting, they will hold off construction until someone else in their village tries first. Again, first movers are vital for pushing rural people to change from traditional ways.

*Challenge 3: Rural borrowers are known to have poor discipline with credit use, particularly poorer households because of the pressure to meet personal day to day needs.<sup>9</sup>*

Possible Solution: Loan contract could link borrowers with MFIs and biogas plant constructors or PBPO to ensure that credit is used for building a biogas plant. The PBPO could play the role of monitoring and following up with biodigester users before, during and after construction. For instance, prior to the construction of a plant and credit disbursement, PBPO could help monitor whether clients have collected enough dung to start up a biogas plant. By this way, credit providers and project implementers can assess the seriousness of clients to construction a biodigester. Clients will feel pressed to be cautious with their credit use.

*Challenge 4: Income sources of rural households are prone to natural disasters such as floods and diseases, increasing the likelihood of loan default.*

Possible Solution: The project should try to prevent default cases, not only because it means losses for MFIs and FMO, but most importantly because it could dissuade other potential biodigester users from borrowing in the future. Although it is not necessarily sufficient, it is suggested that credit operators and the PBPO actively engage and encourage their clients to participate in different business networks or to pick up on other income activities. This is most feasible when credit clients are linked or located close to a market, allowing them to know the changes in demand, which is the opportunity for investment. The PBPO, as experts in their field, could also help reduce default risk by

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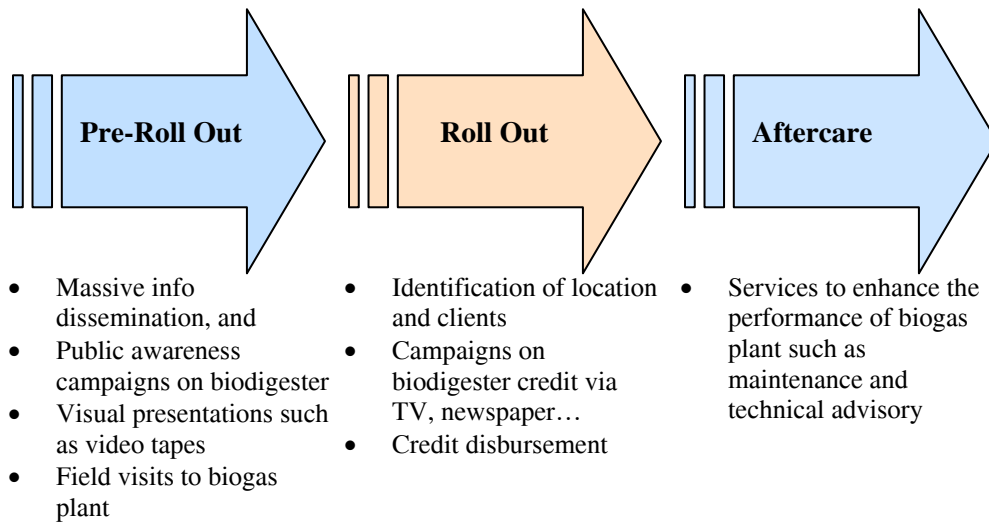
<sup>9</sup> Based on qualitative interviews with MFIs and a recent assessment conducted by CIDS in early 2006 on repayment risks of rural borrowers

providing technical advice on live-stock raising (e.g. how to prevent and treat animal diseases).

*Challenge 5: Pigs often catch untreatable diseases because farmers do not buy vaccine, which is perceived to be too expensive.*

Possible Solution: In particular, households with few pigs generally feel that the cost of vaccinations is higher than the benefits. On the other hand, households who raise many pigs tend to vaccinate their pigs because the potential loss is high given that diseases are highly contagious.<sup>10</sup> Credit operators, with the help of PBPO, should concentrate on households with a significant number of pigs, and work closely with local veterinarians as well as medicine suppliers to ensure that pigs and/or other livestock stay health.

**Figure 7: Phases of Roll Out Strategy**



These challenges and possible solutions indicate that a successful product roll out strategy (see Figure 7) should be done in stages: 1) pre-roll out, 2) roll out and 3) aftercare.

In the **pre-roll out phase**, the NPBO and PBPO could coordinate to provide massive information dissemination and public awareness campaigns on the benefits, technical preparations and usage of a biogas plant. These campaigns could be accompanied with visual presentations of what a biogas plant is, such as via video or field visits. Images can have powerful effects on rural people. After being well-informed, clients may feel more confident in the advantages of a biogas plant, increasing their demand for micro-credit to finance construction. Subsequent to this, credit campaigns could be carried out by MFIs in collaboration and coordination with the NPBO and PBPO to inform the public about the biogas plant credit, possibly via televisions, newspapers and information sessions. The

<sup>10</sup> This understanding is based on interviews with veterinarian in Svay Rieng province.  
*Assessment on the Conditions for Linking Microfinance*  
*Cambodia Institute of Development Study*

PBPO, specifically, could help dissemination information through their networks with potential biodigester users.

The second phase is the actual **roll out of the financial product** by MFIs to biodigester clients. At this stage, the active involvement of the PBPO to help identify locations and clients may be needed for a success launching as well as in ensuring credit access to biodigester clients (as mentioned in the previous chapter). The PBPO could also facilitate meetings between high potential biodigester clients and MFIs to reduce transaction costs for MFIs. Some suggests for selecting the most optimal locations and clients are provided below.

- *Selection of locations*

In selecting the locations to pilot the credit programme, project implementers should consider factors that will increase the probability of success. Other non-pilot potential locations will refer to these models when making their decision on whether to construct a biodigester or not.

Pilot locations should be areas that have the most favorable conditions for high loan repayment and for sustaining the biogas plant in the longer term. Some suggested criteria for selecting the highest potential locations are listed in Table 9 along with the rationale behind them:

**Table 9: Criteria for Selecting Locations**

Criteria	Rationale
• Cluster of pig and cattle-raising with sufficient capacity	• Technical factor
• Natural disasters (e.g. floods, which could interrupt live-stock activities as well as the biogas plant)	• Sustainability factor
• Linkage to market	• Ability to repay
• Living standards	• Ability to repay

Based on the survey of two provinces, Svay Chrum district is an optimal location for Svay Rieng province and Cheung Prey district for Kampong Cham province.

- *Selection of clients*

Selection of the first clients of the biodigester credit programme may also be critical for the success and scale up of the project. Good clients will increase the confidence of other potential biodigester clients, while bad clients will dissuade them from participating in the programme. Of course, there should not be a policy of client discrimination. The strategy would be to identify and promote people with the highest potential to serve as first movers, without neglecting other potential clients.

Some suggested criteria for identifying first movers are:

- Technical level of pig-raising activities (e.g. vaccinations, how easily can livestock get sick)
- Proactive people such as those who attend information sessions and actively ask questions to learn more
- Sufficient repayment sources
- Strong reputation and good habits in paying debt

The third phase, **aftercare**, involves services as maintenance services and technical advisory to biodigester users during and after the construction of a biogas plant to help support continuous use of the plant. These services could help enhance the performance of the biogas plant, which will be heavily scrutinized and observed by other villagers before they decide to invest. The NBPO and PBPO could coordinate with construction companies to guarantee that there is delivery of quality products and services to biodigester users. Construction companies could also be a key source of technical advice to biodigester operators. The PBPO again could play an important intermediary role during this stage to help biogas plant users get the information and assistance they need.

In sum, gaining the trust of potential biodigester clients is critical for the long-term success of the biodigester programme. The culture of fear in trying new things combined with general low living standards and fixed assets predicts that project implementers will face high skepticism from rural clients on the benefits of a biodigester. This means that if one or two villagers encounter a bad experience, such as loan default or low quality biogas plant, this could easily damage the confidence of villagers and result in a project dead end. Thus, it is important that the roll out strategy carefully select the highest potential locations and clients, who have the highest probability of success, as well as the most suitable service providers to help facilitate clients in order to build trust in rural areas.

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Cambodia Institute of Development Study (forthcoming). *Baseline Study for Strengthening Micro, Small and Medium Enterprises in Cambodia*. Phnom Penh: Cambodia

Project documents of the National Biodigester Programme

## Appendix 1: Biogas Household Questionnaire

Interviewer	Date: (d/m/y) / /	Ref. N°:
Inspected by	Date of Inspection	

### A. BACKGROUND AND BIODIGESTER POTENTIAL

Name of Interviewee		
Age	Sex <input type="checkbox"/> Female <input type="checkbox"/> Male	Phone N°
Province		District
Commune		Village

1. How many family members are living with you that are able to work?

\_\_\_\_\_ people

2. How many m<sup>2</sup> is your home?

\_\_\_\_\_ m<sup>2</sup>

3. Do you have any pigs?

<input type="checkbox"/> yes (continue to Q. 4)	<input type="checkbox"/> no (skip to question 6)
---	--

4. If you have pigs, what kind of breeds? *Fill out table below*

5. If you have pigs, what is the daily feeding of each pig in kg? *Fill out table below*

Pig (1)	Breed* (2)	Daily Feeding (3)	T. Rate (4)	Estimated Dung = (3) * (4)
1		Kg	0.75	Kg
2		Kg	0.75	Kg
3		Kg	0.75	Kg
4		Kg	0.75	Kg
5		Kg	0.75	Kg
6		Kg	0.75	Kg
7		Kg	0.75	Kg
8		Kg	0.75	Kg
<b>Total</b>		<b>Kg</b>	<b>0.75</b>	<b>Kg</b>
<b><i>If total estimated dung is less than 10 kg, end interview.</i></b>				

\* Breed option:

- 1: Hainam
- 2: Landrace
- 3: Yorkshire
- 4: Duroc
- 5: Kondol (local breed)
- 6: Cross-breed
- 7: Hamshire
- 8: I don't know
- 9: Other (specify):

6. Do you have any other livestock?

Livestock (1)	How many? (2)	Total Daily Feeding (3)	T.Rate (4)	Estimated Dung = (3) * (4)
<input type="checkbox"/> cow		Kg	0.75	Kg
<input type="checkbox"/> buffalo		Kg	0.75	Kg
<input type="checkbox"/> chicken		Kg	0.75	Kg
<input type="checkbox"/> duck		Kg	0.75	Kg
<i>Grand total of dung per day for all livestock (in kg)</i>				

7. Over the next few years, will you...?

<input type="checkbox"/> increase your livestock	<input type="checkbox"/> decrease your livestock	<input type="checkbox"/> keep it the same	<input type="checkbox"/> I don't know
--	--	---	---------------------------------------

8. When do you sell your livestock? *Fill out table below*

9. At sale, what is the average weight of your livestock? *Fill out table below*

10. After sale, how long until you buy a new livestock to replace? *Fill out table below*

Type of Livestock	When Sell*	Weight at Sale (kg)	Replace (in weeks)
<input type="checkbox"/> pig		Kg	Week
<input type="checkbox"/> cow		Kg	Week
<input type="checkbox"/> buffalo		Kg	Week
<input type="checkbox"/> chicken		Kg	Week
<input type="checkbox"/> duck		Kg	Week

\* When Sell:

- 1: Emergencies
- 2: I don't know
- 3: Never sell
- 4: 1-3 months
- 5: 4 – 6 months
- 6: 7 – 9 months
- 7: 10 – 12 months
- 8: more than 12 months
- 9: Other (specify):

11. Have you every heard about using livestock dung to produce gas?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
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12. Are there any biodigester plants in your village or nearby villages?

<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> I don't know
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13. Are you interested in changing your energy source?

<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> I don't know
<p>If yes, why? <i>Select all that applies</i></p> <p><input type="checkbox"/> current source is expensive</p> <p><input type="checkbox"/> current source is not convenient</p> <p><input type="checkbox"/> current source is of poor quality</p> <p><input type="checkbox"/> other (specify):</p>	<p>If no, why? <i>Select all that applies</i></p> <p><input type="checkbox"/> current source is cheap</p> <p><input type="checkbox"/> current source is convenient</p> <p><input type="checkbox"/> current source is of good quality</p> <p><input type="checkbox"/> other (specify):</p> <p><b>(If no, end interview after this question)</b></p>	

14. Are you interested in constructing a biodigester plant?

<input type="checkbox"/> Yes (↓)	<input type="checkbox"/> No (↓)
If yes, what size?  <input type="checkbox"/> 1-3 m <sup>3</sup> <input type="checkbox"/> 4 m <sup>3</sup> <input type="checkbox"/> 6 m <sup>3</sup> <input type="checkbox"/> 8 m <sup>3</sup> <input type="checkbox"/> 10 m <sup>3</sup>	If no, why? <i>Select all that applies</i>  <input type="checkbox"/> no budget <input type="checkbox"/> I don't know what a biodigester plant is <input type="checkbox"/> other (Explain): <hr/> <hr/>

**B. DEMAND FOR MICROCREDIT**

1. Do you lack money to finance the construction of a biodigester?

<input type="checkbox"/> Yes	<input type="checkbox"/> No <b>(End interview)</b>
------------------------------	--

2. Are you interested in getting a bank loan to finance the construction of a biodigester?

<input type="checkbox"/> Yes (Continue to question 3)	<input type="checkbox"/> No
	If no, why not? Select all that apply.  <input type="checkbox"/> I don't know about the banking / loan procedures <input type="checkbox"/> The interest rate is too high for me <input type="checkbox"/> Getting loan requires informal payment <input type="checkbox"/> The collateral requirements make it impossible for me to apply for a loan <input type="checkbox"/> Bank procedures are too time consuming <input type="checkbox"/> I am currently in debt <input type="checkbox"/> Other (Explain): <hr/> <hr/>
	If these problems (from above) are resolved (for example: you receive information about the loan process or the collateral requirements are reduced), would you be interested in getting a loan?  <input type="checkbox"/> Yes ( Continue to question 3) <input type="checkbox"/> No <b>(End Interview)</b>

3. If you are interested in a bank loan, how much would you like to borrow for constructing a biogas plant?

\_\_\_\_\_ Riels

4. What **interest rate** would be acceptable for you? (Note: All banks must charge an interest rate, so emphasize that they cannot answer 0%)

\_\_\_\_\_ % per month

5. What **credit term** would be acceptable for you?

<input type="checkbox"/> < 3 months
<input type="checkbox"/> 3 months to < 6 months
<input type="checkbox"/> 6 months to < 12 months
<input type="checkbox"/> 12 months
<input type="checkbox"/> more than 12 months <= 24 months
<input type="checkbox"/> > 24 months

6. What types of **collateral** would be acceptable for you?

<input type="checkbox"/> no collateral	<input type="checkbox"/> rice paddy
<input type="checkbox"/> land plot	<input type="checkbox"/> livestock
<input type="checkbox"/> house plot	<input type="checkbox"/> don't know
<input type="checkbox"/> motorcycle	<input type="checkbox"/> other (Explain):
<input type="checkbox"/> gold and jewelry	

7. What kind of payment schedule would you want? Please explain in the box below.

<i>For example: pay interest monthly and wait to pay total principal at the end of the credit term</i>
--

**C. REPAYMENT CAPABILITY**

1. What will be your main sources for making loan repayment? *Select all that applies*

<input type="checkbox"/> profit from economic activity
<input type="checkbox"/> borrow from family or friends
<input type="checkbox"/> borrow from private money lender
<input type="checkbox"/> borrow from MFIs or banks
<input type="checkbox"/> I don't know
<input type="checkbox"/> other (explain):

2. Are any of your income sources vulnerable to the following... *Select all that apply.*

<input type="checkbox"/> Natural disasters (floods, drought..)	<input type="checkbox"/> Uncertainty in the market (price, buyers)
<input type="checkbox"/> Diseases	<input type="checkbox"/> Other (Explain):

3. If you are under a situation of default, what are you most likely to do to repay the loan?  
*Select all that applies*

<input type="checkbox"/> liquidate assets (e.g. sell chickens, house, land...)
<input type="checkbox"/> borrow from family or friends
<input type="checkbox"/> borrow from private money lender
<input type="checkbox"/> borrow from MFIs or banks
<input type="checkbox"/> I don't know
<input type="checkbox"/> I will never fall into default
<input type="checkbox"/> other (explain)

**Thank you for your cooperation.**

## **Appendix 2: Interview Guidelines for Financial Institutions**

### *Introduction of study*

- This study is commissioned by the National Biogas Programme (NBP) in Cambodia and the SNV<sup>11</sup>, a Netherlands-based, international development organization.
- The purpose is to assess opportunities to provide micro finance to potential biogas plant users
- Explain what a biogas plant is and its benefits (handout brochures)
- As part of the project, the FMO<sup>12</sup> have expressed interest to participate in this programme through activities such as providing loans, guarantees or other investment promotion activities to MFIs.
- The purpose of this interview is to learn more about your organization and to seek your interest in collaborating in this project.

### *Profile of MFI*

- Number of branches in Kampong Cham and Svay Rieng province
- Number of districts in operation in the two targeted provinces
- Loan outstanding in the two provinces
- Targeted clients (i.e. poorest people, businesspeople, women... )
- Number of clients in the two provinces
- Year operations were set up in the two provinces

### *Perception on Rural Clients*

- Main credit use
- Repayment sources and risks
- Challenges with lending to rural clients (concerns of credit providers)
- Why do you think some rural people hesitate to borrow?

### *Lending Schemes and Credit Conditions*

- What types of lending schemes do they offer? (i.e. group lending, individual credit)
- What are the credit conditions related to these schemes? (i.e. interest rate, credit term, collateral, payment schedule...)
- Any special lending schemes or conditions to certain target groups?

### *Interest in our project*

- Would you be interested in providing credit to people to construct biogas plants?
- What kind of special agreements or credit conditions would you willing to offer to potential biogas users?
- What role do you see for FMO?

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<sup>11</sup> SNV is a Netherlands-based, international development organization that provides advisory services to nearly 1800 local organizations in over 30 developing countries to support their fight against poverty. See <http://www.snvworld.org>.

<sup>12</sup> FMO supports private sector development in Asia, Africa and Latin America by loans, activation and guarantees. See more info: [www.fmo.nl](http://www.fmo.nl).

### **Appendix 3: Interview Guidelines for PBPO**

#### *Status of Operations in PBPO*

- Please explain to date some of the activities that have been undertaken by your PBPO. For instance, any dissemination of information
- What kinds of resources (e.g. staff, networks...) are available at your PBPO?
- Any relationship between PBPO and potential biodigester users?
- How many households have constructed a biogas plant?

#### *Potential Biodigester Users*

- About how many households in the surveyed districts are raising more than 5 pigs and/or 2 cattle?
- What is the situation with energy sources in the area?
- How much does electricity cost in the province?

#### *Intermediary Role*

- What kind of role can your PBPO play in a credit programme for biodigester users?

Note to interviewer: Observe the level of knowledge of officers on biodigester

#### Appendix 4: Credit Schemes and Conditions

Item	ACLEDA	AMRET	PRASAC	CEB
<b>Loan Size and Interest rate</b> (monthly, riel)	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - Below 1,500,000 Riel with 2 – 3.75%</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - Below 600,000 Riel with 3.5%</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - 50,000 – 500,000 Riel</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - Below 1,500,000 Riel with 3.5%</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Individual loan</b> - 60,000 – 40,000,000 Riel with 2 – 3.75%</li> <li>- Below 500 \$ with 3%</li> <li>- 500 – 1,500 \$ with 3 %</li> <li>- Higher than 1,500 \$ with 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual loan</b> - Below 1,000,000 Riel with 3.5%</li> <li>- 100,100 – 2,000,000 Riel with 3.5%</li> <li>- 2,000,100 – 5,000,000 Riel with 3.5%</li> <li>- 5,000,100 – 20,000,000 with 3%</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - 300,000 – 40,000,000 Riel with 3 – 3.5%</li> <li>- 15 – 10,000 \$ with 2 – 3.5 %</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - Below 1,500,000 Riel with 3.5%</li> <li>- Below 1,999 \$ with 3%</li> <li>- Higher 2,000 \$ with 2%</li> </ul>
<b>Term</b>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - 6 – 48 months</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - 12 months</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - 12 months</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - 18 depending on credit size and risk</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - 6 – 48 months</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - 12 months</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - 24 depending on type of businesses</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - 18 depending on credit size and risk</li> </ul>
<b>Repayment Schedule</b>	<ul style="list-style-type: none"> <li>- Pay interest rate monthly and wait to pay total principle at the end of the credit term</li> <li>- Pay interest rate and principle monthly for 12 months</li> <li>- Seasonal payment</li> </ul>	<ul style="list-style-type: none"> <li>- Pay interest rate and principle monthly</li> <li>- If they have no ability to pay due to problems with business, it gives support by letting them pay only interest rate from 1 to 4 months</li> </ul>	<ul style="list-style-type: none"> <li>- n/a</li> </ul>	<ul style="list-style-type: none"> <li>- Monthly interest rate and principle payment</li> </ul>
<b>Requirements</b>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - Volunteer group (2–10 people), no collateral</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group loan</b> - Good behavior, villager, over 18 year-old, and no collateral</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - Volunteer group (3–8 people), not family member</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Group Loan</b> - Volunteer group (2–8 people), and collateral</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - Collateral, legal business, guarantor, and honest</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - No collateral and specific business for the money below 1,000,000 Riel</li> <li>- Collateral and guarantor</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - Collateral, legal business, guarantor, and honest</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Individual Loan</b> - Collateral and legal business</li> </ul>

## Appendix 5: List of People Consulted

Date/Time	Name/Title/MFI	Address	Telephone
13.07.2006, 9:10 am	Dos Dinn Operational Manager, AMRET	#72-74, St 598, Boeung Kok II, Toul Kork, Phnom Penh,	012-926-100
13.07.2006, 1:30 pm	In Siphon Director of Credit Department, ACLEDA	#28 Mao Tse Tung Blvd. Sangkat Beung Trabek, Khan Chamkarmon, Phnom Penh, Cambodia.	023-364-619
13.07.2006, 2:45 pm	Ly Sokheit Operational Manager, CEB	#40, St 111, Phnom Penh, Cambodia	012-212-867
13.07.2006, 4:00 pm	Oum Sam Oeun Credit Controller, PRASAC	#25, St 294 & 57, Boeung Kengkang1, Chamkarmon, Phnom Penh, Cambodia	012-411-715

## Appendix 6: Terms of Reference for Consultant

### Terms of Reference

#### Assessment of the conditions for linking micro finance to Household Biodigester construction in Cambodia

##### **0. Introduction**

This ToR is about assessing opportunities to provide micro finance to potential biogasplant users. In section 1 a brief description is given of the biodigester programme. Section 2 explains in more detail the biodigester programme and its need for micro finance. Section 3 regards the research questions for the assignment. Section 4 focusses on more practical issues like the requirements for the consultants. For more information regarding the directly involved parties, please refer to the respective websites: [www.fmo.nl](http://www.fmo.nl) and [www.snvworld.org](http://www.snvworld.org).

##### **1. Programme environment and aim**

Encouraged by the results of the first phase of the project in Vietnam (January 2003-January 2006) and in view of the potential for domestic biogas in that country but also in Cambodia, the Ministry of Agriculture, Forestry and Fisheries (MAFF) and SNV<sup>13</sup> agreed on the joint development of a domestic biodigester programme.

It is foreseen that 17500 domestic biogas plants in 6 provinces over a period of 4 years will be constructed. The programme has officially started with the signing of the implementation arrangements 2006. It seeks to ignite a lasting consumer demand for domestic biogas plants and to encourage high quality services to meet this demand.

**The overall goal** The mass dissemination of domestic biodigesters as an indigenous, sustainable energy source through the development of a commercial, market oriented, biodigester sector in 6 selected provinces of the Kingdom of Cambodia

##### **The main implementing actors are:**

- The Biodigester Programme Steering Committee, with representatives of relevant organizations, guiding and coordinating the programme;
- The MAFF - Department for Animal Health and Production (DAHP), as the key partner organisation for organization ion of the project;
- The National Biodigester Programme Office (NBP)), established under the DAHP, implementation of the programme;
- The Provincial Biodigester Programme Offices under the Provincial Departments of Agriculture;
- Independent technicians, trained by the programme and managed by the Provincial Biodigester Programme Offices.
- SNV Laos, providing technical assistance.

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<sup>13</sup> SNV is a Netherlands-based, international development organisation that provides advisory services to nearly 1800 local organisations in over 30 developing countries to support their fight against poverty. See <http://www.snvworld.org>.

At provincial and district level, the programme cooperates through the provincial Department of Agriculture, with the private construction teams and other service providers.

## **2. Assessment for Finance Strategy**

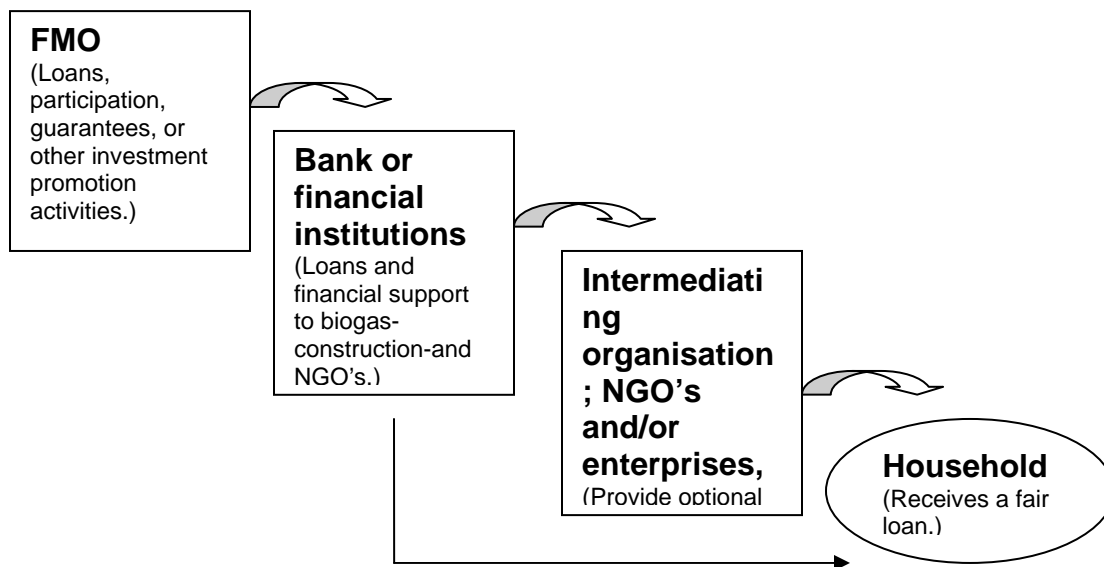
### **2a. Background of the biogas programmeme**

A household biogas plant costs about 300 USD and extra kitchen-, toilet- and stable renovation or other house improvements may double this investment. In Cambodia so far, most of the users have funded the biogas plant by using their own financial recourses, or through loans from family and friends.

As the intervention increasingly focuses on lower income groups, it is foreseen that access to financial recourses will become an important issue in the decision to purchase a biogas plant. Current conditions under which financial institutions offer this kind of small loans are often unfavorable and pull households away from buying a biogas plant.

Therefore a strategy has to come in place to address this problem and increase access of potential biogas-plant users to micro credit. In anticipation to this, on December 13 2005 FMO<sup>14</sup> had a meeting with SNV to discuss the biogas programme and the possibility to link finance to biogas-users. It was expressed that FMO could possibly finance interested financial institutions which, in turn, would finance either the biogas-end-users or the biogas plant constructors.

The following chart summarizes our intentions:



<sup>14</sup> FMO supports private sector development in Asia, Africa and Latin America by loans, activation and guarantees. See more info: [www.fmo.nl](http://www.fmo.nl).

## **2b. Micro finance and biogas**

One of the aspects that have to be dealt with is to provide an enabling environment in which sound financial mechanisms allow (poorer) households to get the needed funds to buy a biodigester. This environment entails awareness of the biodigester advantages and disadvantages as well as proper awareness of the loan conditions by both credit providers and clients.

To come to a financial product that is interesting for all parties, several issues have to be clarified, these issues form the basis of the research and are explained in more detail in section 3 on the next page.

## **3. Method used for the assignment**

### **3a. Research questions**

*Household level:*

1. Are potential biogas plant users interested in receiving micro finance?
2. What are the credit conditions which are acceptable for potential plant users?
3. Estimation of how many biogas plant users are interested in receiving micro finance (in a specific area)
4. What is the coverage of recognized financial institutions in the programme area?

*Provincial Biodigester Programme offices*

5. Are PBPOs interested and able to be an intermediary for micro finance?

*Provincial level:*

6. Which financial institutions are interested to finance the costs of biogas plants, either directly or through biogas plant constructors?
7. What are the conditions potential biogas plant users or constructors would get from these financial institutions? This question has to be posed on a national level.
8. What role could FMO play in financing these loans? (Also for the national level)

*National level:*

9. Is there a way to bring the financial institutions in line with acceptable conditions for the potential users (see question 2)?
10. What are alternatives if financial demand and supply cannot be brought together and can FMO play a role here?

The results of the study are to be used by FMO, SNV and NBP to develop their policy regarding linking (micro)-finance to biogas. The consultant will conduct an assessment in two designated provinces; Kampong Cham and Svay Rieng. The consultant will write a short and readersfriendly report. The report will include a section containing advice on how to proceed and what strategy should be adopted to increase financial accessibility for poorer households that are interested in buying biogas plants. Prior to the research an inception report will be written in which its approach, methodology, reporting structure, planning and costs are made clear. This will be submitted to SNV for approval after which a consultant contract can be signed.

Additionally, also a study regarding linking micro finance to wholesale finance will be conducted in Vietnam and Lao PDR (please refer to the separate ToR's). Some of the research questions are overlapping and will therefore be conducted for both researches

at the same time. It is foreseen that the other research is conducted during the same period, that the researchers use a similar set-up and that they use each others' findings.

The main reason to split both researches is that combined they would become a very large study, which might hamper clarity.

#### **4. Requirements**

##### **4a. Requirements for the consultants**

Two consultants are foreseen. For both team members the following requirements apply:

- Academic background or thinking level
- Good command of English and Khmer (at least one teammember)
- Experience in micro credit and financial issues is an advantage
- Proven skills in conducting interviews and assessments
- Knowledge of energy, biogas and poverty issues is an advantage
- Willingness to travel

##### **4b. Conditions and further information**

The assignment will take up to 20 working days. The start of the assignment is expected in May 2006, the final report is expected by June.

For more information please contact:

[Jan](#) Lam, SNV Biogas Advisor, [jlam@snvworld.org](mailto:jlam@snvworld.org)

[Chheng](#) Rottanak, NBP Financial Administrator, [rottanak.biogas@camintel.com](mailto:rottanak.biogas@camintel.com)