

FINANCING DOMESTIC BIOGAS IN RWANDA



SNV - RWANDA

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Kigali, October 2008

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Acknowledgement

The author thanks all those who made contribution to this paper. We thank various practitioners particularly National Domestic Biogas Programme (Rwanda), the Banque Populaire du Rwanda and Rabobank (Netherlands) for their inputs.

Special thanks go to the biogas plant constructors and operators who are willing to invest and operate a biogas plant.

We thank SNV for its efforts for providing support to develop a sustainable biogas sector in Rwanda and finally, We thank our fellow advisors, without them, this work would not be there.

Summary

We in Rwanda have a special interest in innovation. In Africa, Rwanda is the first country to embark on the concept of developing a viable biogas sector. Indeed our global vision includes exploitation of little resources we have while responding to today demand in terms of energy, private sector development, financial inclusiveness, etc. for poverty reduction. Biogas is a well illustrated sector combining all of the elements cited.

In Rwanda, policies including zero grazing and strict tree cutting monitoring together with projects like *One Cow per Family* and *Send a Cow* are a good basis for National Domestic Biogas Programme – Rwanda to develop and expand.

A commercially viable programme is the aim of our work, and financial issues and questions occupy the centre of our programme. This paper introduces and discusses various financial tools that the Rwandan biogas sector needs and sets points of discussion for various specialists on how to improve, adapt and update these tools or even introduce new ones.

This present work offers to the reader the following:

- A brief country and programme overview;
- A detailed cost breakdown of a typical 6 m³ domestic biogas plant in Rwanda and source of financing;
- A discussion on financial instruments used/proposed in the Rwandan biogas programme;
- A SWOT analysis for the proposed financial tools and
- The paper ends with a conclusion and recommendations on financing biogas in the future and further improvements.

This paper is limited in a number of ways. No attempt is made to cover the analysis of financial instruments beyond the biogas sector; emphasis is placed only on individual SWOT analysis of financial instruments for biogas benefits. Besides, some instruments are new and/or yet to be applied, further monitoring and analysis are needed to have an in depth understanding.

There is a route to a vibrant biogas sector and a sound financial system means a lot to SNV services. Improving this system together with other technical, institutional and marketing issues among other things are key elements to the success of biogas technology and to the development of a sustainable biogas sector in Rwanda.

Abbreviations

BPR	Banque Populaire du Rwanda
CDM	Clean Development Mechanisms
MININFRA	Ministry of Infrastructure
NDBP	National Domestic Biogas Programme
RWF	Rwandan Francs
SNV	Netherlands Development Organization
USD	United States Dollar

1 Introduction

1.1 Rwanda situation: Country background

The Republic of Rwanda is located in central Africa, just south of the equator with the Democratic Republic of Congo at its western border, Uganda in the north, Tanzania in the east and Burundi in the south. The total surface area is 26 340 km² of which 1 400 km² is water. Kigali, the capital and largest city, is located at the centre of the country. The terrain is mostly grassy uplands and hills and the relief is mountainous with a declining altitude from the west to the east.



Map 1: RWANDA

At present, there are five provinces: North, East, South, West and Kigali city, whose administration is headed by a centrally appointed Governor. These provinces are divided into 30 districts with a mayor at the helm.

Rwanda is a landlocked country with few natural resources and minimal industry. It is a poor rural country with about 90 % of the population engaged in agriculture with limited participation in the market economy (30 to 50 % of the rural population on a given year may not produce a marketable surplus, www.worldbank.org). It is the most densely populated country in Africa with a population standing at 8 162 715 (48 % male, 52 % female) for an area of 26 340 km², which corresponds to a density of 310 inhabitants per km². Keeping in mind that the effectively useful surface only amounts to 18 740 km², this corresponds to an average population density of 433 inhabitants per km². Respiratory illnesses come second after malaria in terms of causes of morbidity in health facilities (p.22, *Rwanda PRSP, 2002*). Primary foreign exchange earners are coffee and tea. The 1994 genocide decimated Rwanda's fragile economic base, severely impoverished the population, particularly women, and eroded the country's ability to attract private investment. However, Rwanda has made substantial progress in stabilizing and rehabilitating its economy to pre-1994 levels, although poverty levels are higher now. Gross Domestic Product (GDP) has rebounded and inflation has been curbed. However as the rest of the world, Rwanda continues to face challenges in environmental preservation (About 2/3 of the natural forest cover in the country has disappeared since the 1950s), energy production and increasing cost of fuel. For instance electricity access is still at 5% and more than 90% households in rural Rwanda depend on fuel wood to meet their domestic energy needs.

1.2 Biogas Programme

The government of Rwanda through its Ministry of Infrastructure (MININFRA), the authority in charge of energy has initiated different initiatives aimed at finding long term solutions to energy shortage in the country where no investment has been done the last 20 years in electricity generation. Amongst these solutions, biogas has been identified as one of the sectors to develop.

A feasibility study has been carried out with the help of the Netherlands Development Organization (SNV), to see the viability of a biogas programme. Some findings include more than 100 000 potential households meeting technical requirements to get a biogas plant, government enthusiast and commitment to such a programme and financial capacity & willingness for farmers to invest in biogas. After this feasibility study, the ministry has set up a National Domestic Biogas Programme with clear objectives of building 15,000 family sized, quality biogas plants by the end of 2011 (first phase of 4 years).

Before deploying the programme, MININFRA provided near 300 000 US\$ as start up funds to experiment biogas technology under a pilot phase and set basis for developing the programme countrywide. The results of the experiment were positive with farmers responding well to the technology and other partners (banks, donors, civil society and private sector) to motivate the government to participate in a 4 year phase for developing a commercially viable biogas sector.

The overall objective of the programme is to develop a commercially viable and market oriented Rwandan biogas sector by ensuring the continued operation of all digesters installed under the biogas programme and by maximizing the benefits of the operated digesters, in particular the optimum use of digester effluent.

Established in 2007, NDBP Rwanda is still in its infant stage, developing the market and establishing all the required tools for achieving its objectives. These tools include proper financing mechanisms, local authorities' involvement, private sector development, etc.

1.3 Number of biogas plants installed by year, by size and region/district¹

With initial targeted area limited to 5 districts², NDBP has amended it to cover the national territory (30 districts) responding to market approach and demand. However, any expansion of the programme to any new district at national level is motivated and justified by technical requirements met by farmers including dung and water accessibility and availability. The following table shows progress made since last year to date (Sept. 2008):

	District coverage	Signed contracts	On-going sites	Digesters in use
TOTAL	13	241	82	24

Targets of number of plants to be installed in future

In an updated planning (may 2008), NDBP plans to install the following number of biogas plants:

Year	Installed biogas plants
2008	600
2009	2 750
2010	4 300
2011	7 200
TOTAL	15 000

¹ Full table in appendix 2

² Implementation plan, 2007

2 Objective, Methodology and Limitations of the Assignment

The main objective of this paper is to give a clear picture on how financial aspects were taken into account mainly by developing a microfinance loan product to help farmers access the biogas technology, together with other financial instruments involved in the programme.

Specifically, the paper will discuss and explain in details the institutional linkage and financing mechanisms in the biogas sector with explanation on processes used in designing such mechanisms.

The author used primary data gathered on field through interview and observation and secondary data from various books and reports and cases were used to supplement the gathered information, references are given in that case.

This paper is limited to financial instruments with lessons learnt within the first year of NDBP-Rwanda. It is presented and discussed to share and discuss on future improvements and additional financial tools that can be applied to Biogas National Programmes for greater impact and efficiency in achieving their objectives.

3 Current costs of domestic biogas plants

Currently in Rwanda, there are biogas plants of 6 and 8 m³ and cost an average of 630,000 and 743,000 Rwandan Francs respectively (1,155 and 1365 USD³). The details of the cost are found in annex 1 of the present paper.

These prices are results of shared analysis got after talks with private companies' owners and do take into account different components including the profit margin of the enterprise.

However, as materials are arising on the market, the programme made a choice of attaching the table above to the contract to allow farmers together with the construction company to update the total cost of materials. The updated part excludes company's profit.

4 Overview of financing of domestic biogas plants

DESCRIPTION	AMOUNT (RWF)	AMOUNT (USD)	Percentage
Farmer's minimum contribution in materials (=cash) (sand, stones, unskilled labour, etc.)	150,000	275	24%
Government subsidy \$365	200,000	365	32%
Remaining balance for farmer to pay in cash or through credit	270,000	515	44%
Total construction costs	630,000	1,155	100

³ 1 USD=545 Rwandan Francs

The financing of a biogas plant can be subdivided into 3 main components:

- In kind (cash) contribution given by the farmer that may vary depending on location;
- A flat subsidy donated by NDBP;
- Cash amount given by the farmer. He can finance this component by using his own cash or by applying for a loan.

Detailed analysis about these different sources of financing is discussed below.

5 Brief description of the instruments applied so far to finance domestic biogas plants⁴

5.1 Farmers' contribution in cash and/or kind

The farmer's minimum contribution constitutes a first step to acquire the biogas plant. It serves as a guarantee of commitment from the farmer. This initial contribution can also be used as "personal contribution" to the investment when applying for a loan in the bank. The loan product is explained further in the document.

The average value of in kind materials is 150,000 Rwf (275 USD) and farmer has to gather all of the materials before construction work begin. Depending on location, prices vary due to materials availability.

This initial contribution is mainly in kind (sand, stones, unskilled labor, etc.) but for those who wish to pay cash the equivalent amount of money can be paid to the private enterprise that will then be responsible for all materials.

5.2 Investment subsidy

For any digester meeting the requirements and accepted by the NDBP-Rwanda, a flat subsidy of 200.000 Rwf (365 USD) is given. The flat subsidy is motivated by the interest of Rwandan authorities/SNV to promote smaller biogas plants.

Though Rwanda is a hilly area, there is no differentiation of hilly or not hilly specificities like in Asia programmes; rather such cost is shifted to the farmer. Experience has shown that farmers in north area (hilly) responded quickly to the programme, even paying cash the total cost of the plant. The reason for this is that this area is more well off (agricultural & livestock) and are needy of alternative to wood fuel in rainy season which happens to be accentuated in the north (hilly). It should be noted also that access to water is not a problem for these farmers and zero grazing is well advanced.

At the beginning of Rwandan NDBP, the cost of a biogas plant had been estimated to less than 1,000 USD and a subsidy had been calculated from that amount on flat basis. However, with the rise of cement price, the flat methodology can show its weaknesses.

The investment subsidy serves also as a commitment from the Rwandan government that contributes financially to this investment. The 200,000 Rwf (365 USD) is composed by 75% given by a donor and the balance of 25% is given by the government of Rwanda.

Though defined this year 2008, the amount of subsidy is not defined for the last 3 years. With economic capacity of poor becoming more and more fragile, a minimal level should be defined and agreed upon with donors and other stakeholders.

5.3 Bank loan

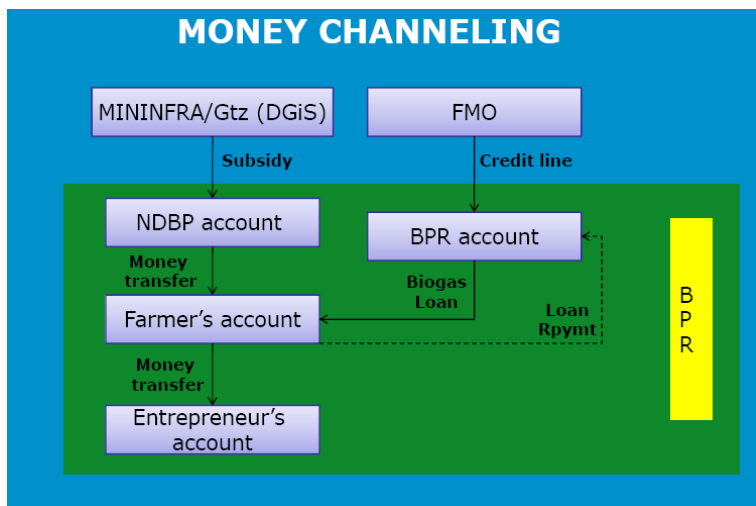
With farmer's contribution amounting to 150,000 Rwf (275 USD) and the subsidy of 200,000 Rwf (365 USD), the total cost of 620,000 Rwf (1,135 USD) is not fully financed and the farmer needs other sources of financing for the 280,000 Rwf (515 USD) remaining.

⁴ For easy understanding; calculations are made on a 6m³

NDBP-Rwanda has done a study to find out which bank the programme would make business with and that has technical capacity of developing and disbursing a microfinance product (loan) to farmers willing to invest in biogas. With its national outreach, Banque Populaire du Rwanda, formerly a cooperative credit & saving bank, has been chosen to be the financial institution to deal with this theme at the start of the programme.

To be able to finance the biogas portfolio, SNV has approached FMO (Netherlands Development Bank) and the latter agreed to lend at good conditions (through its Energy Fund) to BPR. However, the agreement between the two institutions is still to be signed.

Additionally, the bank has been chosen to host the subsidy account from the NDBP-Rwanda. Such practices unify the financial process within the programme. In addition, subsidy management by the bank allows the programme to avoid bureaucracy and lengthy government procedures and processes required by Rwandan law regarding Public funds management/tendering.



The characteristics of a developed loan product are attached in appendix 3.

5.4 Credit line for construction companies

In addition to financial tools developed for farmers, private companies also need financial resources for their expansion and running (working capital & investment capital), these financial services will be offered by their bank or BPR that would have developed enough skills in biogas sector. Since all payments are done within the bank system, biogas contracts can serve as a guarantee for private companies that want to apply for such credit facility. These conditions are those usually applied for credit line products within banks.

5.5 Credit terms to construction companies

At the beginning of the programme, private companies in an emerging biogas sector have expressed concerns over materials supply and the financial circuit not being harmonized, mainly due to the payment from the programme occurring after quality control. This is done to ensure quality to the user, yet creates cash shortage for construction companies when they need it (during construction).

Construction companies, with its signed contract to build a fixed number of plants, can negotiate with suppliers for different materials that will be used in construction. The supplier gives a credit term to the construction company that will settle the loan after programme payment. The terms of this instrument are designed accordingly to reflect the particulars of the sector (e.g 30 day credit).

This instrument is likely to be more developed as suppliers and construction companies get to know each other very well and deepen their commercial relationship.

5.6 Carbon rebate

As world discuss on the future of our planet, opportunities arise for national programmes to trade carbon credits in CDM or voluntary market. NDBP-Rwanda has potential buyers like HIVOS but must fulfill some technical requirements (i.e specific baseline) as to set basis for future negotiations including methodology to be used, price to pay and other issues.

The benefit of carbon off set will contribute to the sustainability of the programme which could use the money paid for more outreach, marketing, subsidy, etc.

6 Strengths, weaknesses, opportunities and threats of the applied financial instruments

The above instruments have different characteristics and a detailed analysis is discussed here (only 3 instruments).

Name of the financial instrument	Analysis of the financial instrument	
Investment subsidy	<p><u>STRENGTHS</u></p> <ul style="list-style-type: none"> - Start up (run-up) biogas sector - motivates small farmers to invest in biogas - Direct payment to companies through farmer's account (avoiding misuse by the farmer) - Easy to administrate/understand - Quick to cash as Channeled through bank system - Ensures quality plants (guarantee) - Bank is assured (government participation/plant quality check) - Promote digesters for the less well-off - Smart-subsidy (ownership by the government insured at the beginning) 	<p><u>WEAKNESSES</u></p> <ul style="list-style-type: none"> - Fixed amount (but total cost depends more on geographical characteristics and inflation)
	<p><u>OPPORTUNITIES</u></p> <ul style="list-style-type: none"> - Fine tune the terms/adjusted to inflation (percentage of cost, items, etc.). - 	<p><u>THREATS</u></p> <ul style="list-style-type: none"> - May be very lowered in next years (after 1st phase) - Subsidy expressed in a fluctuating money (international context) - Cost of materials and Inflation - Farmers relying on subsidy (subsidy dependence)
Bank loan product	<p><u>STRENGTHS</u></p> <ul style="list-style-type: none"> - Tailored to farmers' capacity - Low interest rate - Longest repayment period - Loan product easy to understand and administrate (fixed payment and standardization throughout the bank outlets) - In product term, Annuity = spending on fuel/month 	<p><u>WEAKNESSES</u></p> <ul style="list-style-type: none"> - Bank officers do not yet master biogas technology - Repayment risk associated - No collateral yet defined - Limited amount for simplicity purpose - Relying on 1 bank at the start can delay processes

Bank loan product	<u>OPPORTUNITIES</u> <ul style="list-style-type: none"> - Product to be adjusted (fine tuned terms and amount revised for all sizes) - Loan marketing for the bank can be used by NDBP - Bank involvement constitutes another quality channel for biogas product marketing and awareness - New MFIs to be attracted in financing biogas (competition) 	<u>THREATS</u> <ul style="list-style-type: none"> - Rely on subsidized sources of finance (case of Rwanda)
Carbon rebate	<u>STRENGTHS</u> <ul style="list-style-type: none"> - Payment to the programme - Product ready to the market in biogas 	<u>WEAKNESSES</u> <ul style="list-style-type: none"> - Not easily understood - Many methodologies
	<u>OPPORTUNITIES</u> <ul style="list-style-type: none"> - Investment from big companies (parrainage) 	<u>THREATS</u> <ul style="list-style-type: none"> - Methodology used becoming obsolete - After 2012 woolly

7 Main lessons learnt

The Biogas sector is starting to take off in Rwanda; it has been delaying for some reasons and hereunder some challenges faced and lessons learnt from there:

- The institutional setup took so long; first to separate the programme to existing units to avoid lengthy government procedures through an independent agency, unfortunately this did not work and NDBP is located within a ministry and almost all government procedures do apply to it. SNV has been trying to help in putting independent procedures to easy NDBP work (money channeling is a good example);
- Though farmer's in kind contribution is subject to many variations (materials and transport costs, availability of materials and/or their availability on site, compliance with quality standards, etc.) it is key to the success of the programme as it shows farmer's real commitment to biogas investment. Such minimum participation should be kept to guarantee the motivation and serve as basis in getting bank loans, as well as ensuring minimum and reduced cost in construction.
- Subsidy constitutes a great tool in convincing farmers to invest in a new technology. However, initial phase subsidy need to be well analyzed to enable easy programme development. Because initially farmers had to pay only 300 USD; it required more efforts to differentiate the initial phase to market approach (loan part);
- As costs of materials go high, it is essential to not define the exact amount the farmer has to contribute; otherwise, the programme will be held responsible for the difference arising from the market;
- With a weak dollar, the real value of the fixed subsidy gets lower as planned amounts are expressed in this currency, this made MININFRA to revise subsidy and fix it to 200.000 Rwf (365 USD up from 300 USD);
- FMO – BPR deal took too long at the expense of developing the sector in whole. Due to that the credit system is not yet in place.
- Farmers are eager to take loans to invest in biogas construction, as a matter of fact, though the loan has not yet been launched within the bank; some farmers take other consumption loans to finance the construction of their plant.

8 Conclusions and recommendations

Conclusion

For biogas to achieve success and its objectives, it needs various stakeholders to build up and execute various tools including financing. Technical characteristics are well known and discussions on financial aspects are to be an added value for programmes to well understand what they deal with and how to maximize benefits of biogas mainly to the farmer but also to other stakeholders involved in developing and implementing financial instruments. Each instrument is vital but needs others to work and produce tangibles results.

In Rwanda, the loan product is yet to be deployed but farmers are waiting this instrument that will enable them to easily invest in a proven easy-to-manage technology. Subsidy has attracted many farmers to initially invest in biogas thus taking a step ahead in marketing the technology in their neighborhoods and villages. Concerning carbon credits, due to global pressure on the environment that continues to rise, we have various opportunities to attract more investors and expand financial possibilities and HIVOS has already showed its interest in buying carbon credits from Rwandan biogas programme.

Recommendations

- Loans are to be well assessed by the bank not to be the reason for system failure, but farmers need much more assistance from NDBP to master management of financial facilities made available to them within respective programmes. This attention might include support to bank management in educating people about financial culture and planning;
- Subsidy program could be flexible. As costs of materials tend to go up and threaten progress in field, some changes could be introduced. These changes could mean subsidy as a percentage of plant total cost to be updated each year. To retain the comparative advantage for smaller farmers, this percentage could be the same for all size;
- In addition, subsidy could be expressed in “item – price”. For instance price of cement makes 1/3 of plant total cost, and programmes might express their subsidy in such product;
- Close monitoring should be kept on price changes of carbon credit to get the best offer for our programmes. Thanks to recent developments within the lead NDBP support organization i.e SNV, specialists in CDM are now being recruited and included in teams to get expertise and accurate advice. As methodologies evolve, we should keep ourselves ahead and maximize the potential benefits to our respective programmes in getting as much as possible from such changes
- Furthermore, tapping the infinite possibilities given by today’s technology progress, we can use IT and global connection to Internet to attract investors (mainly big companies that wish to limit their impact on the environment) to invest small amounts in biogas (for instance loans to farmers as Kiva business model)⁵ and boost the number of potential farmers acquiring biogas plant or/and be used as complement to subsidy sources already secured by programmes.
- For a coherent and vibrant biogas sector, attention is not limited to farmers. Financial instruments for private companies have to be developed and go along with those already in existence. For now two instruments are ready here that are credit line (bank facility) and credit terms (supply facility). The logic behind these is the same and what the programmes do (can do) include:
 - ✓ Helping banks and if possible suppliers in defining technical terms,
 - ✓ Official recognition of private companies to facilitate their business and train them in management,
 - ✓ Facilitate linkage to international network (for appliances supply for example), etc.
- Finally, one of instruments we can recommend to introduce is a loan - insurance for biogas plants. Such insurance would cover the plant installation against possible accident, for example 2 years after the guarantee period, thus leaving the farmer fully covered for the first 3 years (loan pay back period), in case of any damage (not related to poor construction work) the insurance company would pay an agreed on amount covering the balance amount of the loan and enabling the farmer to make further investment in biogas.

⁵ www.kiva.org: Kiva lets you lend a specific entrepreneur in developing world – empowering them to lift themselves out of poverty.

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Appendix 1: Cost break of 6 and 8 m3 (Capital city - 2008)

Cost estimates for NDBP biogas digester				6 m3			8 m3		
SN	Items	Unit	Unit Cost	Qty	Total Cost	Total Cost	Qty	Total Cost	Total Cost
1	Building materials		FRW		FRW	USD		FRW	USD
1,1	Stones	m ³	8 000	6,0	48 000	88	8,0	64 000	117
1,2	Gravel 2mm diameter maximum	m ³	16 000	2,0	32 000	59	3,0	48 000	88
1,3	Clean coarse sand	m ³	7 200	2,5	18 000	33	3,5	25 200	46
1,4	Clean fine sand	m ³	7 200	2,5	18 000	33	3,5	25 200	46
	Sub total 1				116 000	213		162 400	298
2	Cement								
2,1	Portland Cement	bags	10 500	18,0	189 000	347	22,0	231 000	424
	Sub total 1				189 000	347		231 000	424
3	Hardware materials								
3,1	Acrylic emulsion paint/weather guard	litres	2 500	2,0	5 000	9	3,0	7 500	14
3,2	PVC Adapter nipple 1/2	pcs	850	4,0	3 400	6	4,0	3 400	6
3,3	PVC Adapter socket 1/2	pcs	750	1,0	750	1	1,0	750	1
3,4	Binding wire	kg	1 000	1,0	1 000	2	1,0	1 000	2
3,5	Biogas lamp	pcs	15 000	1,0	15 000	28	1,0	15 000	28
3,6	Biogas stove*	pcs	15 000	1,0	15 000	28	1,0	15 000	28
3,7	Gas hose pipe	m	2 000	1,5	3 000	6	1,5	3 000	6
3,8	Gas outlet pipe with 1 1/4-1/2 reducer elbow	pcs	8 000	1,0	8 000	15	1,0	8 000	15
3,9	Hosepipe Nipple	pcs	2 000	3,0	6 000	11	3,0	6 000	11
3,10	Hosepipe clamp	pcs	300	6,0	1 800	3	6,0	1 800	3
2,11	Gas valve 1/2"	pcs	4 500	4,0	18 000	33	4,0	18 000	33
3,13	Tangit Glue	kg	9 000	0,5	4 500	8	0,5	4 500	8
3,14	Galvanized Nipple 1/2"	pcs	400	5,0	2 000	4	5,0	2 000	4
3,15	Galvanised Plug 1/2"	pcs	400	1,0	400	1	1,0	400	1
3,16	Pressure gauge	pcs	5 000	1,0	5 000	9	1,0	5 000	9
3,17	PVC elbow 20mm	pcs	500	9,0	4 500	8	9,0	4 500	8
3,18	PVC pipe 110 mm	pcs	10 000	1,0	10 000	18	1,0	10 000	18
3,19	PVC pipes 20 mm	pcs	3 000	8,0	24 000	44	8,0	24 000	44
3,20	PVC tee 20 mm	pcs	300	1,0	300	1	1,0	300	1
3,21	Wall clamps	pcs	400	4,0	1 600	3	4,0	1 600	3
3,22	Steel rods 8mm	pcs	3 500	4,0	14 000	26	5,0	17 500	32
3,23	Seal tape	pcs	200	3,0	600	1	3,0	600	1
3,24	Galvanized Union	pcs	400	1,0	400	1	1,0	400	1
	Sub total 1				144 250	265		150 250	276
4	Construction cost								
4,1	Skilled labor	Lumpsum			40 000	73		50 000	92
4,2	Unskilled labor	Lumpsum			30 000	55		40 000	73
4,3	Supervision	Lumpsum			15 000	28		15 000	28
4,4	Overheads and profit margin for company	Lumpsum			40 000	73		50 000	92
4,5	After sale services	Lumpsum			20 000	37		20 000	37
4,6	Transport	Lumpsum			25 000	46		25 000	46
	Sub total 1				170 000	312		200 000	367
	Total cost				619 250	1 136		743 650	1 364

Appendix 2: Progress to date (2008 data)

District of operation	District plans 2008	Signed contracts		On going sites		Completdomes		Digesters in use	
		29-sept	06-oct	29-sept	06-oct	29-sept	06-oct	29-sept	06-oct
1. Burera	0	9	0	0	0	0	0	0	0
2. Gasabo	72	12	0	1	0	0	0	0	0
3. Gatsibo	29	16	29	0	0	0	0	0	0
4. Gicumbi	299	75	0	4	0	10	0	8	0
5. Kayonza	0	26	0	6	0	6	0	0	0
6. Kicukiro	0	4	0	1	0	0	0	0	0
7. Musanze	39	6	0	3	0	10	0	6	0
8. Ngoma	3	33	0	11	0	15	0	10	0
9. Nyabihu	234	5	0	0	0	0	0	0	0
10. Nyanza	0	2	0	0	0	0	0	0	0
11. Ruhango	189	3	0	0	0	5	0	0	0
12. Rulindo	177	21	0	0	0	10	0	0	0
	1042	212	29	26	0	56	0	24	0
TOTAL		241		26		56		24	

Appendix 3: Loan product characteristics

Item	Qty	Unit	Details about the unit	Amount (in RWF)	Amount (in USD)
<i>Monthly cash-flow (milk production)</i>	<i>30</i>	<i>Days</i>		<i>15.000</i>	<i>27.5</i>
<i>Annual Financial Cash Flow (FCF)</i>	<i>12</i>	<i>Months</i>	<i>Maximum</i>	<i>180.000</i>	<i>330</i>
<i>Estimated minimum</i>	<i>67%</i>	<i>of FCF</i>	<i>annually</i>	<i>120.000</i>	<i>220</i>
Loan amount based on	34	Monthly	Instalments (excluding interest)	281.267	516
Loan period incl. 2m grace	36	Months	Maximum loan period		
Annuity of the loan		Monthly	rounded	10.000	18.3
Fixed Interest Rate	13%	Annually	Lowest interest rate		