

**National Domestic Biogas and Manure Programme**

# **Implementation Plan 2010-12**

**(NDBMP IP 2010-12)**



**Bangladesh**

**10 December 2009**

## Executive Summary

Majority (68%) of the population of Bangladesh is depending on agriculture. The cattle dung is still a principle source of fertilizer. Declining of soil fertility in Bangladesh is attributed mainly to over-exploitation of land without proper replenishment of plant nutrients in soils. Crop residues and animal dung are widely used as fuel rather than fertilizer.

It is estimated that about 55 percent of the country's energy is met through traditional energy (biomass) sources. Most of them are used for cooking. There is scarcity of fuel wood in the country as only 14 percent of the total land area is covered by forest. Only around 35 percent of the population, mainly in urban areas has access to electricity.

Among the other potential alternative sources of rural energy, biogas generated from animal dung is undoubtedly one of the most appropriate sources of energy in the rural communities. Keeping this fact in mind Infrastructure Development Company Limited (IDCOL) is implementing National Domestic Biogas and Manure Programme (NDBMP) through several national and local partner organisations with the technical and financial assistance of Netherlands Development Organisation (SNV) and Kreditanstalt für Wiederaufbau (KfW). The overall objective of the NDBMP is to further develop and disseminate domestic biogas plants in rural areas with the ultimate goal to establish a sustainable and commercial biogas sector in Bangladesh. This programme will help to attain objectives of Poverty Reduction Strategic Plan and also MDG set by Government of Bangladesh.

NDBMP was initiated from 2006 and till October 2009, a total of 8510 quality plants have been constructed and subsidy has also been disbursed. During the extended programme period of 2010-12, additional 27,000 quality biogas plants are targeted to be constructed. A total of 37,269 quality plants are targeted to be constructed till 2012. Several activities will be implemented to achieve this target. Promotion and subsidy administration will be one of the activities in which Taka 9,000 (about Euro 92) will be provided as investment subsidy. Similarly, construction of high quality plants will be ensured by enforcing quality control system. To ensure proper functioning of the plant, guarantee on plants for 5 years and maintenance services will be provided for 3 years and training on operation and maintenance will be provided to each user. Different nature of trainings will be devised and imparted to the staff of the partner organizations to strengthen their

capabilities. Similarly, proper management and utilization of bio-slurry will be given high emphasis while implementing the programme.

IDCOL will be the main implementing partner and will be responsible for overall management of the programme and sector coordination with the support from various institutions and partner organizations. IDCOL will administrate subsidy and credit while other programmes activities slurry utilisation, technical trainings, promotion and coordination of POs will be outsourced to the local expert institutions and possibly developed as Local Capacity Builders and partners. The slurry management and utilization is outsourced to Bangladesh Agriculture Research Institute (BARI) and Technical trainings to Directorate of Technical Education (DTE). Promotion and marketing activities will also be outsourced to a potential institution from 2010 onwards. NDBMP team will focus on the quality management and monitoring of the activities undertaken by LCBs, partners and POs. Total budget of the programme for the period 2010-12 amounts to Euro 10.76 million, in which biogas households' contribution is Euro 6.2 million (out of which 3.1 million Euro will be provided by KfW for refinancing through IDCOL); Government of Bangladesh is expected to contribute 0.37 million; DGIS through SNV contributes 1.35 million for the programme activities and management and KfW contribution is 2.1 million for subsidy provision. In addition, KfW will provide a sum of 3.1 million Euro a credit fund through IDCOL and partners to promote biogas household lending, while there may be in the near future an opportunity of generating carbon finance through trading carbon emission reduction from biogas plants.

## Abbreviations

ASS	After-Sales-Service
BARI	Bangladesh Agriculture Research Institute
BCSIR	Bangladesh Council of Scientific Industrial Research
BDT	Bangladesh Taka /Taka
BPO	Biogas Programme Office
BSC	Biogas Steering Committee
CDM	Clean Development Mechanism
CO <sub>2</sub>	Carbon Dioxide
CPO	Construction Partner Organization
CPR	Construction Progress Report
DAE	Department of Agricultural Extension
DGIS	Directorate General for International Cooperation
ERD	Economic Relation Division/ Ministry of Finance
FY	Fiscal Year
GHG	Green House Gas
GI	Galvanized Iron
GOB	Government of Bangladesh
HH	Household
IDCOL	Infrastructure Development Company Ltd
IEC	Information, Education and Communication
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
LCB	Local Capacity Builders
LCPO	Lending & Construction Partner Organization
LPO	Lending Partner Organization
MFI	Micro Finance Institute
MPO	Manufacturing Partner Organization
MPR	Maintenance Progress Report
NGO	Non Governmental Organization
NGOAB	NGO Affairs Bureau
NDBMP	National Domestic Biogas & Manure Programme
OC	Operation Committee
PCR	Plant Completion Report
QC	Quality Control
R&D	Research and Development
SNV	Netherlands Development Organisation
TA	Technical Assistance

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# **1 Introduction and Background**

## **1.1 Country Background**

Bangladesh is one of the densely populated countries of the world. An estimated current population of Bangladesh is about 150 million with population densities of almost 1,000 persons per sq km with an annual growth rate of 1.7 percent. The number of households is estimated to be about 28 million and number of persons per family was reported to be 4.9. Over 80 percent population of Bangladesh resides in rural areas.

The country's economy is based on agriculture. Exporting of garment products is one of the largest sources of national income. Remittances from several million Bangladeshis working abroad are also the important source of income. The country has made considerable progress in reducing poverty in comparison of 80s when nearly one third of the population was poor by that time. However, agricultural labourers and small farmers still fall under the high level of poverty.

## **1.2 Agriculture and Livestock Sector**

Majority of the population (68%) of Bangladesh is dependant upon agriculture. The cattle dung is still a principle source of fertilizer. Declining of soil fertility in Bangladesh is mainly due to over-exploitation of land without proper replenishment of plant nutrients in soils. Crop residues and dung are widely used as fuel rather than fertilizer.

Most of the farm households keep livestock mainly cattle and buffalo. Livestock is mainly kept for milk, meat and fertilizer purposes. Due to the lack of sufficient arable land for livestock feed production, most of the households collect forages from non-arable land. This has also resulted into a gradual declining of cattle population per household.

## **1.3 Energy Situation**

It is estimated that about 55 percent of the country's energy is met through traditional energy sources. Most of them are used for cooking. Excessive use of biomass energy may already exceed the regenerative limit and there prevails energy crisis in rural areas.

The total forest area covers only 14 percent of the total land area in Bangladesh. Thus fuel wood collection from forest is difficult. Agriculture residues and dung are commonly available in and around the household premises. It becomes more difficult to collect biomass fuels in monsoon season especially during the flooding period.

Bangladesh has potentially very large natural gas resources but with small reserves of oil and coal. 66 percent of the commercial energy consumption is shared by natural gas, with the remainder contributed

mostly by oil and limited amounts of hydropower and coal. Only around 35 percent of the population, mainly in urban areas has access to electricity, and per capita energy consumption is only 68 kilowatt-hours annually, which is one of the lowest rates in the world.

So far, in the process of the development of renewable energy, about 35,000 biogas systems and 400,000 solar home systems have already been installed in Bangladesh by October 2009.

## **2 Biogas in Bangladesh**

### **2.1 Introduction to Biogas Technology**

Biogas, which is mainly composed of methane (60-70%) and carbon dioxide (30-40%) is a combustible gas produced by anaerobic fermentation of organic materials by the action of methanogenic bacteria. Methane is odourless gas and burns with a clear blue flame without smoke. When biogas is used in suitable designed burners, it gives a clean, smokeless, blue flame, which is ideal for cooking. If biogas is used in specially designed lamp it gives a light similar to the kerosene pressure lamps. Family size biogas plant is appropriate for the domestic use such as cooking and lighting.

The first Indian KVIC model floating-drum biogas plant was constructed in 1972 at the premises of Bangladesh Agriculture University (BAU) for research and study purposes. Later, on Bangladesh Council for Scientific Industrial Research (BCSIR), Local Government Engineering Department (LGED), German Development Cooperation (GTZ) and some other organizations promoted this technology. From 2006 onwards, SNV involving local partner organizations has been trying to scale up the domestic biogas through out the country.

### **2.2 Potential of Domestic Biogas**

Biogas is generally considered feasible if temperature is warm, feeding materials such as water, cattle dung and high quality construction materials are easily available; transporting construction materials is easy and human resource for plant construction is locally available. Looking into the above conditions, Bangladesh has higher prospects for the technology as it fulfils all of them.

Regarding the availability of cattle dung, a livestock census carried out in 1996 revealed that 8.44 million households were reported to keep 22.29 million of cattle/buffalo. Out of this about 952,000 households used to rear more than 5 heads of cattle per household whereas about 2.1 million households keep average 3-4 cattle heads per household. Similarly, about 116,000 poultry farms are operating in Bangladesh. If we consider these smaller sized biogas plants the total technical

potential from the available raw materials reach to about 3 million plants.

### **3 National Domestic Biogas and Manure Programme**

In order to supply energy to the rural households and prevent further environmental and agricultural deterioration, SNV Netherlands Development Organisation has initiated the National Domestic Biogas and Manure Programme (NDBMP) in 2006 involving Infrastructure Development Company Ltd (IDCOL) and several other local partner organizations. Till November 2009 more than 9000 biogas plants has been constructed in different parts of the country.

A Mid-term Review of NDBMP was held in mid 2008 with the objective to assess the progress and to provide the recommendations for the implementation of the programme. NDBMP's physical achievement against target was very low mainly due to administrative and managerial issues like the delayed registration of SNV Bangladesh, less motivated POs, delay in the availability of credit facilities and high staff turnover in IDCOL. But the programme is close to a market oriented implementation and has been able to operate because of the commitment of IDCOL in providing necessary funds for biogas loans even though in limited forms. Considering the potential and opportunity to achieve the original targets and for further up scaling the promotion of domestic biogas the MTR recommended for extending the implementation period.

For funding of necessary refinancing for the construction of biogas plants GOB had approached German Government. KfW was supposed to phase in with a loan fund in the beginning of 2007, but the fund was actually available to IDCOL in the beginning of 2009 only. In addition to credit fund, KfW is providing investment subsidy from 2010 onwards. Hence considering recommendation from MTR and committed funds from DGIS and KfW, this NDBMP Implementation Plan 2010-12 has been developed.

#### **3.1 Programme profile**

Programme name	National Domestic Biogas and Manure Programme
Programme duration	January 2010 – December 2012
Working area	All over Bangladesh where domestic biogas plant is feasible
Construction target	27,000 domestic size biogas plants
Implementing partners	Infrastructure Development Company Limited, Bangladesh together with its Partner Organisations selected from private companies and local NGOs.

Donor support	DGIS (through SNV) and KfW
Technical support	SNV Netherlands Development Organisation

### **3.2 OBJECTIVES OF THE PROGRAMME**

#### 3.2.1 Overall Objective

The overall objective of the National Domestic Biogas and Manure Programme (NDBMP) is to further develop and disseminate domestic biogas plants in rural areas with the ultimate goal to establish a sustainable and commercial biogas sector in Bangladesh.

#### 3.2.2 Specific Objectives

The specific objectives contributing to its overall objectives are:

- To attract and strengthen organizations for sustainable development of the biogas sector,
- To increase the number of quality biogas plants by 37,269 in the till 2012,
- To stimulate internalization of all benefits of the biogas plants including utilization of bio-slurry,
- To ensure the continued operation of all biogas plants constructed under the program.

### **3.3 Plant Design**

NDBMP is successfully implementing a fixed brick dome design biogas plants in Bangladesh. The designs are basically two types; a) design for cattle dung and human excreta, and b) design for poultry droppings. Each design has 6 sizes of different gas holding capacities. These sizes are 1.2, 1.6, 2.0, 2.4, 3.2 and 4.8 m<sup>3</sup>/day gas production capacity. The gas produces from the last two sizes plants can be used for multiple houses where as other sizes will be used for single household.

### **3.4 Linkages of Programme Objective to Government Policies**

Recently, Government of Bangladesh has approved Renewable Energy Policy 2008 which is a strong step forward for the development of Renewable Energy in Bangladesh. The policy emphasizes on promotion of renewable energy including biogas.

NDBMP through the supply of clean energy and high quality organic fertilizer contributes to achieve some of the millennium development goals and poverty reduction strategies set by the Government of Bangladesh. Contribution of biogas in this regard will help poverty

reduction through savings on energy expenditure and increase agriculture production by maximum utilization of bio-slurry as high quality fertilizer; gender equality through empowering women in decision making and maximization of their participation in the programme; and better health through cleaner cooking energy and improving sanitation with toilet construction and connection to bio-digester.

## **4 Strategic Approach**

The following will be the main strategic ingredients of the programme in the period 2010 up to 2012:

### **4.1 Carrot and Stick Approach**

For the initiation of the programme and to attract the private sector the quality control system with the agreed standards was quite flexible but following the experience the system has been updated. The quality default points<sup>1</sup> which were put to 9 has now been decreased with the experiences and it is planned to drop to 7 by the end of 2012. NDBMP can not compromise on quality while it strives to increase quantity as well. To maintain quality of installations and the services to the clients, NDBMP strictly enforces quality assurance systems to improve and continue the "carrot and stick" approach. The existing quality assurance system which has the subsidy leverage will be improved further and used to ensure high quality of outputs. The existing criteria and mechanisms for listing of companies, performance evaluation, grading as well as for financial penalty, de-listing, etc. will be reviewed and revised. The idea is not to act as a police but to behave like a strict guardian with transparent "carrot" and "stick" system. This also means that, NDBMP will take the approach of supporting the partner organisations to improve their performance through counselling, capacity building, motivation and business promotion.

### **4.2 Cluster Construction Approach**

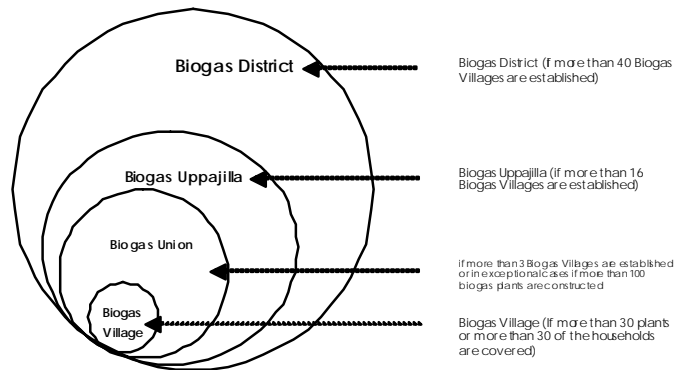
In the first years of the NDBMP, the programme partner organisations had constructed biogas plants in 63 districts out of 64 districts in total. It has been realised that rather than spreading the effort in the wider area and parachuting the technology, all the focus should be in very potential areas to gain the confidence and later replicate the same phase wise. Hence a concept of Cluster Construction Approach for scaling up the installations was formulated which was initiated through celebration of Biogas week in early June 2009 and declaring 12 villages with more than 20 biogas plants as Biogas village which will further be developed in the potential areas. Continuous initial support for such initiatives will be provided until the owners have confidence on the technology. Further to

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<sup>1</sup> Each quality standard is allocated with some marking depending upon its importance for the optimum usages of the plants. The non compliance by the POs on any quality standard will be scored with the respective quality score. The quality default point of an installation is the summation of quality standard scores. Lower the quality default points better is the quality of the installation.

this, Biogas Uppajilla concept will also be developed, rather than promoting sporadic construction, blanket approach in the potential areas will be promoted as follows:

- Biogas Village (if more than 30 biogas plants are constructed in a village)
- Biogas Union (if more than 3 Biogas Villages are established or in exceptional cases if more than 100 biogas plants are constructed)
- Biogas Uppajilla (if more than 16 Biogas Villages are established)
- Biogas District (if more than 40 Biogas Villages are established)



### 4.3 Horizontal Linkages for Synergy and Complementarities

In addition, NDBMP aims to become more holistic by linking it up with other rural development activities for synergy and complementarities.

The most relevant linkage in promotion of biogas plants is of course, organic fertiliser, in which there has at least been a good start with the involvement of Bangladesh Agriculture Research Institute (BARI). Still the data from the field trials need to be collected and analysed. Based on the research outcome comprehensive extension programmes need to be developed. But still the programme, however, should go further and seek linkages with other activities like income generation activities (e.g. taking a combined loan for income generation and biogas plant, fodder management activities, diary development activities, organic food production, etc).

### 4.4 Financial Sustainability of the Programme

The prior experiences of closure of biogas programmes due to no proper after sales support services the sector faced great fallback. Few villagers still consider biogas not a good technology due to the previous mindset hence NDBMP had a hard time convincing and changing the perception of the communities regarding the real benefit of the technology. As donor financial support come to an end after 2012, the programme is likely to face an abrupt closure. Despite the fact that the programme has been able to disseminate few thousands of biogas plants, farmers are far from being able to fully pay for the construction. On the other hand, most of the partner organisations are not yet capable of sustaining the business on a fully commercial ground.

This situation demands continuation of the quality ensuring discount (subsidy) and the technical assistance for continued dissemination of the technology, while attempting to better commercialise the sector. A scenario of substantially reduced external support for things other than provision of subsidy and quality assurance is likely to be achieved in not so distant future.

Fortunately, there is a good prospect of the programme as it could raise its own revenue through the Clean Development Mechanism (CDM) and likely to be instrumental in sustainability of the programme, provided things work out as expected.

## 5 Output Targets

Looking into the strong need for harnessing alternative sources of energy and significant potential for the development of domestic biogas in rural Bangladesh, it has therefore been proposed to extend the existing programme period up to December 2012. The following outputs are expected during the programme period of 2010-12.

### Work goals (Output) of 2010-12

Indicator	Target 2010	Target 2011	Target 2012	Total
No. of biogas plants installed	7,000	9000	11000	27,000
No. of direct beneficiaries from the plants	42,000	54000	66000	162,000
Number of jobs created	1000	1500	800	3,300
Number of households directly benefited with slurry demonstration support	700	900	1100	2,700
Number of households with increased in income due to utilizations of slurry	4,900	6,300	7,700	18,900
Number of Persons provided access to sanitation	700	1350	1650	3,700
Number of beneficiaries through capacity development activities	6,770	8400	9790	24,960
Number of POs	28	28	28	28
Number of appliance manufacturers	4	4	5	5
Biogas plants with compost pits	Minimum 70% of constructed plants	Minimum 70% of constructed plants	Minimum 75% of constructed plants	
Plant functioning	Minimum 95% installed plants	Minimum 95% installed plants	Minimum 95% installed plants	

Plant maintenance	100% of 2009 plants	100% of 2010 plants	100% of 2011 plants	
Number of journalists oriented on Biogas technology	180		200	380
Number of female motivators	200	120	80	400
Cluster Construction Approach	30 Biogas Villages and 5 Biogas Unions	40 Biogas Villages, 5 Biogas Unions and 2 Biogas Uppazilla	30 Biogas Villages, 5 Biogas Unions, 5 Biogas Uppazilla and 5 Biogas District	100 Biogas Villages, 15 Biogas Unions, 7 Biogas Uppazilla and 5 Biogas District

## 5.1 Plant Construction

The original plant construction target was 36,450 (2006-2009) which now is revised and estimated a realistic target of 37,269 plants with the extension of programme period for 3 years. Out of the targeted 37,269 domestic size biogas plants, 27,000 new biogas plants to be constructed in 2010-2012. The plant construction target up to 2012 has been projected as shown in Table-1.

**Table- 1: Plant Construction Target**

Year	2010	2011	2012	Total
Construction target	7,000	9,000	11,000	27,000

## 5.2 Expected Benefits

It is expected that each successful biogas plant will have following benefits as presented in Table- 2

**Table-2: Expected Benefits from the biogas plant**

<b>Benefits</b>	<b>Per HH/ per year /per plant</b>
Reducing workload	49 days (395 hours)
Fuel wood saving	1,500 kg
Agriculture residues saving	508 kg
Dung cakes saving	409 kg
GHG emissions reduction	1-5 tones
Organic fertilizer available	917 kg
Better sanitation (toilets)	(10-15% HH)
Reduction indoor air pollution	All HH

## **6 Activities and Inputs**

### **6.1 Promotion**

In relation to the biogas promotion activities, following activities will be implemented by a local institution (yet to be identified but preferably an umbrella organisation with wide network):

- a) Develop and distribute different IEC (Information, Education and Communication) packages in local language such as: posters, pamphlets, and leaflets that contain information on biogas, its benefits, costs, services, constructors, and subsidy and loan provisions.
- b) Develop audio visuals (TV commercials, documentaries and jingles) on promotion and extension of biogas and bio-slurry applications and broadcast them from TV/local cable/FM stations.
- c) Organize orientation training to the potential users, staff of government line-agency offices, NGOs workers, school teachers and workers of local organizations.
- d) Organize exhibitions and demonstrations.
- e) Motivate biogas plant constructors to concentrate in cluster construction approach and organize effective promotion campaign.
- f) Organize orientation training programmes for journalists and encourage them to write/cover the biogas sector updates.
- g) Organize orientation programmes for teachers and students in biogas potential areas.
- h) Organize biogas week and announce biogas villages.
- i) Link with other rural development programmes and activities like water and sanitation, livestock, education etc

## 6.2 Quality Management

### 6.2.1 Quality Control

An important factor in the success of the NDBMP will be a strict enforcement of carefully devised quality and design standards. Enforcement of the quality standards may be achieved by imposing penalties for non-compliance found during inspection by random sampling. This enforcement will be instrumental in achieving the relatively high operational success ratio for biogas plants in terms of reliability, efficient performance and higher life of the plants. Therefore, a regular quality control of constructed plants needs to be carried out.

The existing quality control procedures will be updated based on the previous year's performances and the current quality default points of 8 will be reduced to 7 within 2012 with the implementation of the carrot and stick approach.

At various instances the users and POs have complained about the quality of the appliances hence the NDBMP team will ensure the quality of all the products manufactured by qualified appliances manufacturers by conducting a random sampling before taking the products out from the manufacturer's gate.

### 6.2.2 After-Sales-Services

Construction of biogas plants only is not sufficient for making the plant functional for longer period of time since it needs regular and effective after-sales-services (ASS) as well. POs are required to provide a warranty of 5 years (on structure) on constructed plants and visit each constructed biogas plant for maintenance at least once a year, starting one year after completion of the construction. This is mandatory for POs to provide maintenance services to plants for 3 years. The warranty and maintenance charge of Taka 700 per plant for the warranty and the ASS visits (two visits) will be deposited in a special account of BPO after deducting the required amount during the time of the disbursement of subsidy to the POs. Payments from this account are made once POs pay maintenance visit, submit maintenance report and gets approval on the report from BPO. The payment for maintenance visit will be Taka 350 per visit per year.

### 6.2.3 Operation and Maintenance by Users

Quality construction is important for functioning of plant efficiently in the long run; however, equally important is the user's involvement in operation and maintenance of the plant. Users usually will have the following responsibilities to ensure the smooth functioning of the plant:

- Proper feeding of the plant;

- Proper use of biogas;
- Regular maintenance/cleaning of plant and appliances;
- Proper use of bio- slurry.

Each biogas household will receive a biogas instruction manual containing all aspects of operation and maintenance as mentioned above. The previous experience of not providing users training has left the users not to get optimum benefits of the installation hence Users training for all the biogas installations will be insured and an effective mechanism will be developed in participatory way along with POs.

### **6.3 Research and Development**

Applied and adaptive researches are always necessary for improvement of the technology for the acceptance by the communities. The technical institutions and universities will be requested to undertake the adaptive researches. Also if the partner organisation comes up with any innovative ideas which have potential of replication will also be supported. R&D activities will mainly be focused on the following topics:

- Cost reduction ,
- Proper methods of utilizing slurry,
- Increasing efficiency on appliances,
- Appliances development,
- Any other aspects as and when needed.

Research will be outsourced on the basis of ToRs to capable research institutes. With its long experience on biogas research and well established physical facilities, BCSIR and Bangladesh University of Engineering and Technology (BUET) may be a capable partner to carry out biogas research.

### **6.4 Training**

Most of the trainings will be outsourced on the basis of ToRs to capable organizations. A Memorandum of Understanding has been signed with Directorate of Technical Education for the provision of technical trainings within the programme using the polytechnic institutes under them. Initially, 5 polytechnic institutes located in different districts under Directorate of Technical Education will be involved and depending upon the progress more polytechnic institutes will be involved. Also initiatives will be taken to mainstream the biogas trainings within the Bangladesh Technical Education Board and the provision of formal certification from the government institution. Following trainings are planned during the programme period and beside these other trainings will also be conducted as per the need to develop the capacity of the sector including the programme staff.

#### 6.4.1 Mason Training

New masons will be given training on construction, maintenance, promotion and slurry utilization. Local person who has at least reading and writing ability and has some experience on masonry works and recommended by POs will be provided the mason training. The training course will be of total 8 weeks including 4 days for theoretical training and seven weeks for on-the-job training under the supervision of a certified master mason. Masons already trained before by some other organizations on masonry works will be given high priority.

#### 6.4.2 Supervisors Training

Since POs are fully responsible for biogas plant construction and maintenance, the activities of masons will have to be regularly supervised and advised. In this context, well trained and sincere supervisors will be required and the gap will be filled with a well designed supervisor training. This training will focus on supervision skills with sufficient knowledge on biogas construction, quality control and reporting procedures. The course will be of 3 days' duration.

#### 6.4.3 Refresher Training to the Existing Masons

A one day refresher training to the existing masons will be organized in the consecutive years. The course will cover reviewing of overall performance on construction in previous year, identification of major areas to be improved, orientation on the changes on construction methods or standards (if any), and dissemination of other relevant information and instructions as necessary.

#### 6.4.4 Refresher Training to the Existing Supervisors

A one day refresher training to the existing supervisors will be organized. The course will cover reviewing of over all performance in previous year, identification of major areas to be improved, orientation on changes on construction methods or quality standards (if any), and dissemination of other relevant information and instructions as necessary.

#### 6.4.5 Management Training

The biogas sector can grow healthy only if the POs are strong enough to deal with basic management issues efficiently. The manager of the POs should have good knowledge on management, marketing and promotion strategies to ensure the company functions effectively. This training aims to provide knowledge and skills to the managers on marketing techniques and strategies, financial as well as personnel management and total quality management of the company.

#### 6.4.6 Training of Trainers

4 days training of trainers for Biogas Users Training will be organized. The training will include topics on training and facilitation methods, planning, organizing, evaluating and managing users' training. The trainees for this training, who will be lead trainers in the future, will be selected from amongst Instructors of Polytechnic institutes under DTE, POs, NGOs and if necessary, from financial institutes as well.

#### 6.4.7 Slurry Management and Utilization Training

Gas production and utilization for cooking is one of the main purposes of biogas plant construction but at the same time proper management and utilization of slurry as organic fertilizer is also equally important. Therefore, to impart knowledge to the users on proper utilization of slurry a 2 days training on slurry management and utilization to the staff of POs, NGOs and agriculture extension workers will be organized. These trained persons will work as resource persons to train biogas users on the importance and methods of composting and slurry utilization. Bangladesh Agriculture Research Institute and/or Department of Agriculture Extension can be the best partner for slurry management training.

#### 6.4.8 Biogas Users Training

The functioning of a biogas plant and its overall efficiency is for a large part determined by how effectively the user is operating and maintaining the plant. Apart from the instructions from the masons and supervisors, groups of users with emphasis on women users will be trained on how the plant works, what output can be expected, how to use the slurry and what maintenance activities are required. This one-day training will be organized by POs in the field to provide factual information to the users.

#### 6.4.9 Gender Mainstreaming Training

Since women are the main beneficiaries of biogas; they will have to be well oriented about its usefulness. In this regard, training related to capacity strengthening of women on decision making, dealing with banks on borrowing and repayment of loan, income generating activities linking with biogas, health and sanitation improvement and plant operation and maintenance will be highly essential. All of such training will help to maximize the participation of women in the programme, thus helping them to maintain gender balance. Trainers training for gender mainstreaming, training for the PO staffs and female motivator's trainings will be conducted to mainstream the gender aspects within the programme. Various workshops and studies as per the specific needs will be conducted after the formulation of TOR and outsourced to competent consultants.

An overview of training and targeted number of trainees by year is presented in Table – 3.

**Table- 3: Target of Training**

<b>Type of training</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>Total</b>
New Mason	600	720	600	<b>1,920</b>
New Supervisor	300	300	300	<b>900</b>
Refresher to existing mason	200	200	200	<b>600</b>
Refresher to existing supervisor	150	150	150	<b>450</b>
Management training	60	30	30	<b>120</b>
Trainers training	30	30		<b>60</b>
Cooperative Farmers training	490	630	770	<b>1,890</b>
Biogas users	4900	6300	7700	<b>18,900</b>
Gender sensitization	40	40	40	<b>120</b>
<b>Total</b>	<b>6,770</b>	<b>8,400</b>	<b>9,790</b>	<b>24,960</b>

## 6.5 Slurry Extension

Maximum number of biogas households will be trained on the method of proper utilization of bio-slurry. Bangladesh Agriculture Research Institute (BARI) will continue the research, field demonstration and training activities related to bio-slurry management and utilization. Other partners will be explored. The slurry utilization activity will include the following:

- Proper composting methods through training and demonstration
- Proper application methods through training and result demonstration
- Training to the POs and staff of other partners
- Integration technique with other income generating activities
- Use of slurry for different purposes other than fertilizer

To carry out these activities, IEC packages such as training manuals, posters, and video-documentary films will be developed and distributed. The slurry extension activity needs high attention thus needs multiple actors. Staff members of POs are the prime persons who are constantly in touch with biogas users. Therefore, their role on advising and training the users on slurry utilization will be highly effective. It also will be a strong marketing tool for the biogas constructors.

## 6.6 Institutional Strengthening

A provision is made to provide financial as well as advisory support to those institutes which will have certain defined stake on the programme. These institutes will be supported to develop a long-term vision and planning to continue their stake in a more sustainable manner. The

support will be based on proposal with clear objectives and output submitted by the concerned institutes.

Mapping of potential development partners and linking with them for effective biogas promotion with potential linkages for awareness building, training, income generation activities, etc. for synergy and complementarities.

Each POs who initiates the cluster construction approach and develops biogas villages and upwards will be provided with some incentives like in 2010 a PO who constructs more than 30 biogas plants in a village, will receive additional 500 BDT per plant. This support is provided to motivate POs into the business and accelerate the number of plant construction in cluster approach. Similarly IDCOL will receive management fees of Euro 5.00 per constructed plant.

## **6.7 Monitoring and Evaluation**

### **6.7.1 Monitoring**

Day to day (process) monitoring will be done by BPO which will make sure that plants of high quality are being constructed as per the plan and all the stakeholders are performing their roles as per the agreement. It regularly reports (quarterly, half yearly and yearly) to apex body and donors in accordance with the prescribed formats.

While conducting various surveys or studies as part of monitoring process, following studies will be required to get desired information on the impacts of biogas programme:

- Biogas users surveys – every year
- Training evaluation – every year
- Slurry utilization and its effectiveness on crop/vegetable production

### **6.7.2 Evaluation**

A final external evaluation will be done in 2012.

## **6.8 Subsidy Administration**

Since subsidy plays a vital role on biogas promotion and maintaining standardized high quality plants, a flat rate subsidy will be continued to be provided to each household who constructs biogas plant as per the plant construction standards and guidelines enforced by NDBMP. The subsidy was provided at Taka 7,000 at the beginning and later on in October 2008 it was increased to Taka 9,000 to compensate for inflation and increase of cost for construction materials. Looking into the

households' low income level and increasing trend of construction costs it is proposed to continue with Taka 9,000 till 2012. The subsidy rates can be reviewed and adjusted in later stage if deemed necessary. Eligibility criteria for getting subsidy will be as follows:

- At least 3 stall-fed cattle (30 kg of dung per day) at home or 200 poultry layer birds (20 kg of litter per day) at farm,
- Only for one plant per household,
- Only for domestic size biogas plant for domestic purposes
- Only for approved plant design,

Subsidy will be channelled through Partner Organizations (POs) using the existing procedures. It is assumed that the Government of Bangladesh will contribute 15% of the subsidy from 2010 onwards. The subsidy administration procedure will be reviewed and made more effective and efficient to maintain the prompt cash flow for POs. The current facility of advance subsidy to POs will be continued and reviewed so that all POs can have access to this facility.

## 6.9 Credit management

In 2007, KfW has signed an agreement with Government of Bangladesh to provide biogas credit fund to the programme and now the fund is being available. With this fund IDCOL will make credit facility available to refinance 80% of the loan of NDBMP's Lending Partner Organizations (LPOs) and Lending and Construction Partner Organisations (LCPOs) to the households. It is assumed that about 80% plants need credit. The calculation of credit requirement (per plant based on 2.4 m<sup>3</sup> average size) is based on the following divisions:

* Total average investment cost	27,000 BDT	(Euro 275)
* Subsidy	9,000 BDT	(Euro 92)
* User down payment (15%)	2,700 BDT	(Euro 27)
* MFIs contribution (20%)	3,600 BDT	(Euro 37)
* Credit fund required from IDCOL/KfW	11,700 BDT	(Euro 119)

Most of the LPOs and LCPOs (MFIs) are smaller and are lacking their own fund for lending (20% mandatory contribution). Keeping this problem in mind, IDCOL may consider the possibilities of making the loan conditions more suitable for LPOs including reduction of the contribution of LPO from 20% to 10%, subject to approval from IDCOL board.

## 7 Institutional Arrangements

### 7.1 Executing organisation

To coordinate renewable energy sector on behalf of the Government of Bangladesh, an APEX body is expected to be formed as indicated in the

Renewable Energy Policy 2008. IDCOL has been implementing Renewable Energy Programmes especially Solar Home Systems and Biogas Programmes on behalf of the Government of Bangladesh with the support from various external development partners. IDCOL should ensure endorsement of Government's renewable energy policies within the biogas sector. A task that will prove increasingly important for the sector is proper coordination between Government ministries, line-agencies and the stakeholders that have a stake on the biogas sector. (See Annex- 2)

## 7.2 Biogas Steering Committee

The Biogas Steering Committee (BSC) comprising of officials from concerned organizations and independent persons is already in practice and looking after the policy and programme matters related to NDBMP implementation. The members of this committee are as follows:

- |   |                    |
|---|--------------------|
| 1. One of the Board of Directors of IDCOL   | - Chairperson      |
| 2. Representatives from ERD   | - Member           |
| 3. Representative from Ministry of Agriculture  | - Member           |
| 4. Director General/Representative from NGOAB   | - Member           |
| 5. Representative from Ministry of Power, Energy & Mineral Resources                  | - Member           |
| 6. Representative from Ministry of Science and Information & Communication Technology | - Member           |
| 7. Energy professor from reputed University   | - Member           |
| 8. Representative from PKSF   | - Member           |
| 9. Representative from SNV  | - Member           |
| 10. Representative from KfW   | - Member           |
| 11. Programme Manager, Biogas Programme Office  | - Member Secretary |

This committee will mainly be responsible for:

- Recommend for approval of the new partner organizations (PO)
- Approval of the Annual Plan of Biogas Programme
- Endorsement of designs and quality standards of biogas and appliances
- Decide on any policy and programme related matter which is deviating from the approved plan
- Giving directives to implementing and partner organizations

Besides the BSC an Operation Committee (OC) will continue to assist BPO in relation to providing field level feedback, promotion, training and slurry extension activities. This OC will meet every month and give its specific opinions and advices to the programme. Representatives from partner organizations including concerned staff of BPO will be the member of this committee.

### **7.3 Biogas Programme Office**

A "Biogas Programme Office" (BPO) which is under IDCOL is responsible to look after the implementation of programme activities. The main responsibilities of BPO are:

- Subsidy and credit administration
- Quality control and quality management
- Internal monitoring of the programme
- Maintain programme activities and physical target database
- Disseminate programme information
- Support for strengthening partners organizations
- Monitor the activities outsourced to LCB

Activities that have to be outsourced to other organizations through the BPO are:

- Slurry extension programme
- Training and capacity building
- Applied research and development (R &D)
- Promotion and Marketing
- Gender mainstreaming
- Survey and studies

### **7.4 SNV Netherlands Development Organisation**

SNV will provide technical advisory services to the programme. In addition, SNV will make available a financial contribution to the programme which is received from DGIS, the Netherlands. SNV will support the NDBMP with the following activities:

- Approval of annual plans and budgets on behalf of the DGIS related to programme support activities (excluding investment subsidy)
- Provide technical as well as programme management advices
- Initiation and participation in monitoring the programme activities
- Participating in Biogas Steering Committee
- Control of DGIS fund

Through the technical assistance, SNV will make available 2 full time advisors (one national and one international) to the programme who will assist for the programme implementation.

### **7.5 KfW**

KfW will make available subsidy and credit fund to the programme through IDCOL from 2010 up to 2012.

## **7.6 Partner Organizations**

There will be 3 types of partner organizations (PO) in the programme implementation level. These PO are: (a) Construction Partner Organizations (CPOs) (b) Manufacturing Partner Organization (MPOs) and (c) Lending Partner Organizations (LPOs). In most cases the same PO can do both construction and lending as per the recommendation of Biogas Steering Committee therefore called Lending and Construction Partner Organisation (LCPO).

From 2010 onwards a Promotional Partner Organisation will also be involved to support the programme mainly on promotional and marketing aspects thus increasing the effective demand of the technology.

## **8 Programme Financing**

### **8.1 Biogas Plant Cost**

It is proposed that in the beginning of every year BPO will conduct a survey based on the standard bill of quantity (see Annex -3). Each of the pre qualified POs will be shared with that costing and to safeguard the customers and POs from unhealthy competition NDBMP will strictly observe the pricing of all POs. As the prices of civil components and the transportation cost varies for different locations, a uniform price everywhere may not be feasible hence on that case certain percentage of deviation will be allowed. As the programme wants to develop a commercially viable biogas sector where private sector provides quality services, the price of the plants will be market based with competition among the POs in compliance with the agreed quality standards.

### **8.2 Subsidy Requirement**

The current subsidy covers about 25% of the total investment requirements. The subsidy rate will be Bangladesh Taka 9,000 per plant (per household). The total subsidy amount required for the programme period is Euro 2.5 million of which KfW will provide 85% while the rest 15% will be contributed from the Government of Bangladesh.

### **8.3 Credit Requirement**

It is estimated that average 80 percent of the potential households will require loans to construct biogas plant. The duration of loan from IDCOL to the LPO is fixed for 6 years with one year grace period. For this purpose, a biogas credit revolving fund received from KfW has been created and the fund will be utilized for biogas construction even after the project period. The POs will provide biogas loans to the biogas

households and are free to determine the interest rates of these loans assuming that market competition will play a role in the determination of the rates.

In addition to the credit facility made available by KfW, IDCOL has also initiated to provide credit facility in compliance with its own rules and regulations to the LPOs who do not qualify for KfW initiative.

#### 8.4 Programme Budget

The total budget required to implement the NDBMP over 3 years will be Euro 10.76 million (details provided in 8.5). The budget includes subsidy, credit, activity and programme management cost, technical assistance and biogas household contributions. However, the component-wise budget breakdown for the programme activities for period of 2010-12 is presented in Table -4.

**Table- 4**  
**Total Budget Required for the Programme Activities excluding Credit and SNV TA (In Euro)**

Code	Activities	Estimated Expenditure in Euro			Grand Total in Euro 2010-12
		2010	2011	2012	
	<b>Plant Target</b>	<b>7,000</b>	<b>9,000</b>	<b>11,000</b>	27,000
A	Promotion	83,418	73,316	78,235	234,969
B	Quality control	54,224	55,219	47,629	157,072
C	Research and Development	19,388	17,347	9,184	45,918
D	Training	35,408	40,714	35,510	111,633
E	Slurry management	64,694	82,821	90,633	238,148
F	Monitoring & Evaluation	30,612	20,408	25,510	76,531
G	Institutional strengthening	52,347	56,224	60,102	168,673
H	Programme management	80,143	85,509	98,223	263,874
I	Gender mainstreaming	23,469	13,265	13,265	50,000
	<b>Programme Activity cost (SNV/DGIS)</b>	<b>443,704</b>	<b>444,825</b>	<b>458,290</b>	<b>1,346,819</b>
	<b>Subsidy (KfW)</b>	<b>642,857</b>	<b>826,531</b>	<b>1,010,204</b>	<b>2,479,592</b>
	<b>Total Programme Cost</b>	<b>1,086,561</b>	<b>1,271,356</b>	<b>1,468,494</b>	<b>3,826,411</b>

Tentative activity and estimated year wise budget for the period is presented in Annex-1.

#### 8.5 Budget Sources

Out of the total amount required for implementing the programme, Government of Netherlands/DGIS/ABP provides Euro 1.35 million for programme operation cost whereas Government of Bangladesh is expected to contribute about Euro 0.37 million on part of subsidy at the rate of 15 percent of subsidy amount while KfW fund of about Euro 2.1 million will be utilized for covering the subsidy for the period of 2010-2012. In addition KfW will also provide Euro 3.1 million for refinancing

the construction of biogas plants. The source wise contribution is presented in Table -5.

**Table-5: Budget Source (in Euro)**

<b>Proposed financing</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>Total</b>
Households (cash/credit)	1.611.842	2.072.368	2.532.895	6.217.105
<i>KfW support for credit</i>	<i>823.200</i>	<i>1.058.400</i>	<i>1.293.600</i>	<i>3.175.200</i>
DGIS/ABP	443.704	444.825	458.290	1.346.819
GOB (15% of subsidy)	96.429	123.980	151.531	371.940
KfW (85% of subsidy)	546.429	702.551	858.673	2.107.653
SNV TA (likely to be supported by KfW)	0	0	240.000	240.000
SNV core fund	240.000	240.000	0	480.000
<b>Total</b>	<b>2.938.404</b>	<b>3.583.724</b>	<b>4.241.389</b>	<b>10.763.517</b>

## 8.6 Carbon Financing Opportunities

Since the pre-conditions of being eligible for CDM project, the ratification of Kyoto Protocol and nomination of Designated National Authority (DNA), are met by the Government of Bangladesh it will be easier to develop biogas as a CDM project and implement from the beginning. There are some technical issues on removal of sustainable biomass for CDM financing are to be clarified yet but more likely carbon fund can be an attractive and sustainable source of funding that will enable to continue the programme even after the project period without external financial support.

## 9 Assumption and Risks

### 9.1 Assumptions

Government of Bangladesh owns the programme and provides full support from its side including 15% of subsidy budget.

One organisation will be hired to look after promotion and marketing activities.

IDCOL and the POs will take the programme seriously and implement the programme as stipulated in this plan.

The activities like slurry extension, promotion and marketing, training and research activities are outsourced and those institutions who took over these activities will carry out the activities more effectively and efficiently.

The POs are capable and strong enough to construct quality plants as planned.

## 9.2 Risks

IDCOL, as experienced in the past, needs more attention on retaining its trained programme staff. High turnover of the staff is a risk for the programme.

The occasional flooding in Bangladesh will squeeze the potential market of biogas and will affect plant construction as well.

The involvement and support from government in the biogas sector has been a matter of considerable concern. A degree of government ownership is critical to the long-term survival and sustainability of the sector. Therefore, an apex body that looks after the renewable energy sector in terms of policy formulation and overall regulation needs to be set up.

Coordination between sector institutions on program interventions, implementing and monitoring has not been seen to be effective in the past. It needs to be made more efficient. Biogas activities need to be coordinated and monitored effectively with the combined efforts of sector stakeholders.

### References:

1. *SNV, August 2005, Feasibility of a national programme on domestic biogas in Bangladesh*
2. *November 2008, Final Report of Mid Term Review of the Asia Biogas Programme*
3. *February 2008, Subsidy Loan Agreement the Government of the People's Republic of Bangladesh and IDCOL*
4. *SNV & IDCOL 2006, Implementation Plan National domestic Biogas and Manure Programme in Bangladesh*
5. *BSP May 2006, BSP Multi Annual Plan Phase IV*

## Annex-1

## Tentative activity and estimated budget for 2010-12 in BDT

## Estimated Programme Budget Breakdown

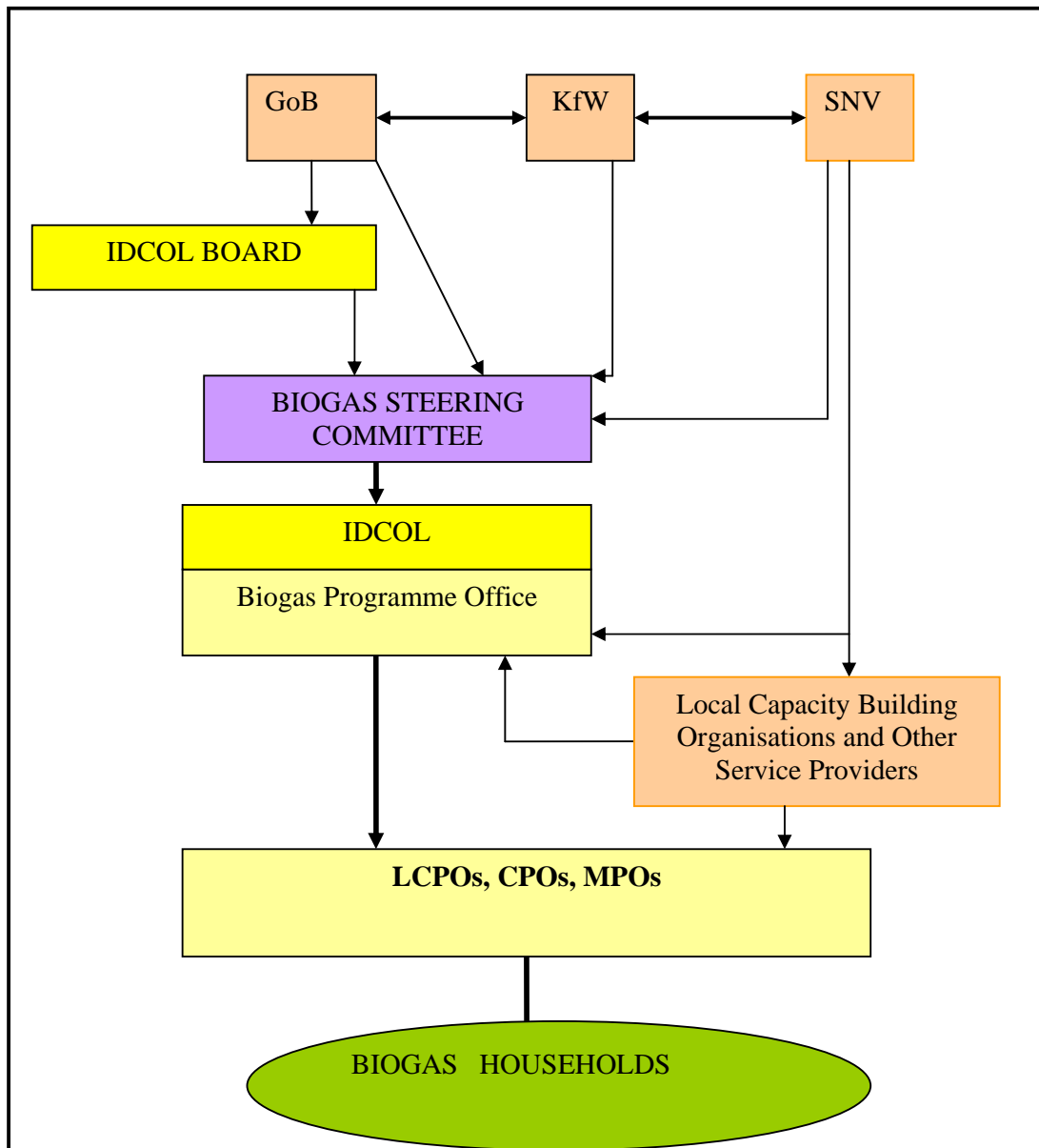
		Flat Subsidy 9000 BDT			
Code	Activities	2010	2011	2012	Total
	Physical Target	7,000	9,000	11,000	<b>27,000</b>
<b>A</b>	<b>Promotion</b>				
	Materials printings/development	2,500,000	1,500,000	1,500,000	5,500,000
	Radio/TV advertisement	1,500,000	1,200,000	1,000,000	3,700,000
	Networking/ seminars/ Exhibitions	1,500,000	1,200,000	1,200,000	3,900,000
	Orientation classes/Farmers visit	875,000	1,125,000	1,375,000	3,375,000
	Operational expenses for Promotional Partner Organisation	1,800,000	2,160,000	2,592,000	6,552,000
	<b>Sub Total</b>	<b>8,175,000</b>	<b>7,185,000</b>	<b>7,667,000</b>	<b>23,027,000</b>
<b>B</b>	<b>Quality control</b>				
	Staff salaries (QC staff)	784,000	840,000	900,000	2,524,000
	TA/DA	2,520,000	3,024,000	2,100,000	7,644,000
	Regional Quality Workshop	250,000	275,000	302,500	827,500
	Mason and Supervisor Incentives (prize bond/crest)	60,000	66,000	72,600	198,600
	Testing of the plants (gas leakage)	45,000	49,500	54,450	148,950
	Initiation for ISO certification of Subsidy and Credit disbursement	350,000			350,000
	Procurement of PH meters	25,000			25,000
	Stakeholders meeting (OC, POs)	180,000	207,000	238,050	625,050
	Exposure visit for POs	300,000	200,000		500,000
	Orientation programme on Quality Management System to POs	400,000	250,000		650,000
	Activities to be decided later	400,000	500,000	1,000,000	1,900,000
	<b>Sub Total</b>	<b>5,314,000</b>	<b>5,411,500</b>	<b>4,667,600</b>	<b>15,393,100</b>
<b>C</b>	<b>Research and Development</b>				
	Bio-slurry research	900,000	800,000	500,000	2,200,000

	Appliances development/local capacity building	500,000	400,000	200,000	1,100,000
	Activities to be decided later	500,000	500,000	200,000	1,200,000
	<b>Sub total</b>	<b>1,900,000</b>	<b>1,700,000</b>	<b>900,000</b>	<b>4,500,000</b>
<b>D</b>	<b>Training</b>				
	Mason training	1,200,000	1,560,000	1,300,000	4,060,000
	Supervisor training	690,000	750,000	750,000	2,190,000
	Refresher mason training	150,000	180,000	180,000	510,000
	Refresher supervisor training	120,000	150,000	150,000	420,000
	Management training	180,000	100,000	100,000	380,000
	Training of trainers	130,000	150,000		280,000
	Team Building training for NDBMP staff	100,000	100,000		200,000
	Training Workshop for Journalists	500,000		500,000	1,000,000
	Entrepreneurship Training for POs	400,000	500,000		900,000
	Activities to be decided later		500,000	500,000	1,000,000
	<b>Sub Total</b>	<b>3,470,000</b>	<b>3,990,000</b>	<b>3,480,000</b>	<b>10,940,000</b>
<b>E</b>	<b>Slurry management</b>				
	Demonstration plots	1,925,000	2,475,000	1,980,000	6,380,000
	Materials development	300,000	200,000	100,000	600,000
	Training of trainers	240,000	280,000	200,000	720,000
	Training of field staff	480,000	450,000	200,000	1,130,000
	Slurry pits bonus to POs	700,000	900,000	1,320,000	2,920,000
	Training to cooperative farmers	245,000	346,500	462,000	1,053,500
	Bio Slurry and Operation & Maintenance training for users	2,450,000	3,465,000	4,620,000	10,535,000
	<b>Sub Total</b>	<b>6,340,000</b>	<b>8,116,500</b>	<b>8,882,000</b>	<b>23,338,500</b>
<b>F</b>	<b>Monitoring &amp; Evaluation</b>				
	Biogas users survey	1,200,000	1,200,000	1,500,000	3,900,000
	Software upgradation	1,000,000			1,000,000
	Activities to be decided later	800,000	800,000	1,000,000	2,600,000

	<b>Sub Total</b>	<b>3,000,000</b>	<b>2,000,000</b>	<b>2,500,000</b>	<b>7,500,000</b>
<b>G</b>	<b>Institutional strengthening</b>				
	IDCOL fee	3,430,000	4,410,000	5,390,000	13,230,000
	Support to new appliance workshop	500,000	300,000		800,000
	Support to POs	1,200,000	800,000	500,000	2,500,000
	<b>Sub Total</b>	<b>5,130,000</b>	<b>5,510,000</b>	<b>5,890,000</b>	<b>16,530,000</b>
<b>H</b>	<b>Programme management</b>				
a)	Management staff salaries	2,976,000	3,531,840	4,238,208	10,746,048
b)	TA/DSA	500,000	500,000	500,000	1,500,000
c)	Office rent/utility/maintenance	2,040,000	2,448,000	2,937,600	7,425,600
d)	Communications	300,000	300,000	300,000	900,000
e)	Office materials	300,000	350,000	350,000	1,000,000
f)	Vehicle cost (Fuel & maintenance)	660,000	700,000	750,000	2,110,000
g)	Furniture	200,000	50,000	50,000	300,000
h)	Office equipments	378,000	100,000	100,000	578,000
i)	Others	500,000	400,000	400,000	1,300,000
	<b>Sub total</b>	<b>7,854,000</b>	<b>8,379,840</b>	<b>9,625,808</b>	<b>25,859,648</b>
<b>I</b>	<b>Gender mainstreaming</b>				
	Female motivators training	500,000	300,000	200,000	1,000,000
	Gender training for POs	400,000	500,000	300,000	1,200,000
	Effect of Biogas in the Biogas villages households	600,000			600,000
	Gender Mainstreaming Trainers Training	500,000			500,000
	Studies and workshops	300,000	500,000	800,000	1,600,000
	<b>Sub Total</b>	<b>2,300,000</b>	<b>1,300,000</b>	<b>1,300,000</b>	<b>4,900,000</b>
	<b>Programme Activities Total</b>	<b>43,483,000</b>	<b>43,592,840</b>	<b>44,912,408</b>	<b>131,988,248</b>
	<b>Subsidy</b>	<b>63,000,000</b>	<b>81,000,000</b>	<b>99,000,000</b>	<b>243,000,000</b>
	<b>Grand Total</b>	<b>106,483,000</b>	<b>124,592,840</b>	<b>143,912,408</b>	<b>374,988,248</b>

**National Domestic Biogas and Manure Programme**

INSTITUTIONAL SETUP



## Annex- 3

## Estimated Bill of Quantities of Materials and prices for Biogas Plants

Item	Cow Dung Based							Poultry Based						
	Unit	Quantity						Unit	Quantity					
		1.2	1.6	2	2.4	3.2	4.8		1.2	1.6	2	2.4	3.2	4.8
<b>Materials</b>														
Bricks	Nos	850	935	1130	1250	1470	1890	Nos	770	900	1020	1130	1334	1726
Sands	Cu. m.	1.6	1.8	2	2.2	2.5	3.3	Cu. m.	1.5	1.5	1.8	2	2.3	3
Aggregates	Cu. m.	0.3	0.35	0.45	0.5	0.65	0.9	Cu. m.	0.3	0.34	0.42	0.48	0.62	0.88
Cement	Bags	11	13	15	16	20	26	Bags	11	13	15	16	19	26
GI Wire	Kg	1	1	1	1	1	1.5	Kg	1	1	1.5	1.5	2	2
MS rod	Kg.	8	10	13	16	22	36	Kg.	8	11	14	17	24	41
Polythine	m	1	1	1	1	1	1	m	1	1	1	1	1	1
<b>Appliances</b>														
Dome Pipe	m	0.6	0.6	0.6	0.6	0.6	0.6	m	0.6	0.6	0.6	0.6	0.6	0.6
Gas Pipe/ Fittings	set	12	12	12	12	12	12	set	12	12	12	12	12	12
Main Valve	Nos	1	1	1	1	1	1	Nos	1	1	1	1	1	1
Water Drain	Nos	1	1	1	1	1	1	Nos	1	1	1	1	1	1
Gas Tap	Nos	1	1	2	2	2	3	Nos	1	1	2	2	2	2
Stove	Nos	1	1	2	2	2	3	Nos	1	1	2	2	2	2
Mixer	Nos	1	1	1	1	1	1	Nos	1	1	1	1	1	1
Hose Pipe	m	1	1	2	2	2	3	m	1	1	1	2	2	2
Inlet Pipe	m	4	4	4	4.5	5	5	m	4	4	5	5	6	6
Emulsion Paint	litr	1	1	1	1	2	2	litr	1	1	1	1	2	2
<b>Labour and Service Fee</b>														
Service Fee ('000)	Takka	5	5	5	5	5	5	Takka	5	5	5	5	5	5
Maintenance Fee ('000)	Takka	0.7	0.7	0.7	0.7	0.7	0.7	Takka	0.7	0.7	0.7	0.7	0.7	0.7
Mason, Labours	Mandays	6	7	8	9	10	13	Mandays	6	7	8	9	10	13