

**FIRST DRAFT**

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**Preliminary Assessment of Green Jobs in three sectors:  
(1) Renewable energy (2) Waste management (3) Construction**

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## **1.0 Background**

There is growing acknowledgement among governments, trade unions and employers' organizations that business as usual based on the strategy "grow first, clean up later" is not sustainable, neither economically, nor socially and environmentally. The growing awareness and willingness to act is reflected in the conclusions of the discussion at the 96th Session of the International Labour Conference of the Director-General's Report on "Decent work for sustainable development" and the ILO's 'Green Jobs Initiative', which was launched in collaboration with the United Nations Environment Programme and the International Trade Union Confederation in November 2007. The initiative supports a concerted effort by governments, employers and trade unions to promote environmentally sustainable jobs and development in a climate-challenged world.

As part of the global Green Jobs initiative, the ILO Regional Office for Asia and the Pacific (ROAP) held a research conference in Niigata, Japan, on Green Jobs for Asia and the Pacific. Building on the recommendations of that conference, ILO ROAP is implementing an 18 month pilot programme in 3 countries, namely India, China and Bangladesh, that aims to contribute to identification and testing of pathways to clean development through the creation of green jobs, particularly for women, which reconcile goals for poverty reduction with low greenhouse gas emissions.

In July 2008, a workshop on Green Jobs Initiatives was held in Bangladesh to introduce and raise awareness of the concept of Green Jobs. Participants at the workshop expressed support for Bangladesh as a pilot country on ILO Green Jobs initiatives, noting that as a first step, there was a need to undertake an inventory of existing green jobs initiatives. A number of sectors were outlined in the background paper developed by the Ministry of Labor and Employment in Bangladesh for the workshop on Green Jobs that was held in July 2008 in Dhaka, as well as the priority sectors identified by the ILO research conference in Niigata in April 2008.

Against this backdrop, the consultant has been assigned by ILO Dhaka office to prepare a Preliminary Assessment of Green Jobs in three sectors, they are 1. Renewable Energy, 2. Waste Management and 3. Construction. WCC developed a pre-selection matrix outlining key criteria to help guide the selection of potential sectors to be included in the study.

## **2.0 Present Assignment:**

The consultant is assigned to undertake this short one month assignment to prepare an inventory documenting "who is doing what" in terms of existing Green Jobs initiatives in Bangladesh. Later this inventory may help ILO Dhaka to develop a Value Chain Analysis (VCA) based assessment study on potential areas of intervention on Green Jobs in Bangladesh. VCA is an assessment tool developed by ILO which is in the process of finalization.

## **3.0 Objectives:**

The objectives of the study are as follows:

- a) to promote awareness and dialogue on Green Jobs in Bangladesh;
- b) to identify and to respond knowledge gaps on Green Jobs;
- c) to promote policies and measures to achieve green jobs and green workplaces;
- d) to generate employment and to alleviate poverty within climate mitigation and adaptation programs;
- e) to enhance capacities of ILO constituents; and
- f) to strengthen collaboration between UNEP/ILO/ITUC within the UN systems

#### **4.0 Scope of the Assignment:**

The assessment of green jobs will cover all relevant activities being carried out in the context of the framework of ILO's green job initiatives in three sectors, they are 1. Renewable Energy, 2. Waste Management and 3. Construction.

#### **5.0 Expected Outputs**

The consultant will produce:

1. An outline and plan of activities required in carrying out the detailed study as a follow up to the preliminary assessment;
2. An inventory documenting who is doing what in the area of Green Jobs in Bangladesh

#### **6.0 Timeframe**

One month (January 10, 2009, to February 10, 2009).

#### **7.0 Research Methodology:**

This study is based mainly on scanty secondary sources of information, interview of officials and identified stakeholders engaged in the target sectors, consultation with ILO and other international financing authorities. Papers presented at the two workshops held at Nigata in Japan in April 2008 and in Dhaka in July 2008 and the findings of these workshops formed the background of this study.

Given resource and time constraints and lack of data from secondary source, the consultants developed a pre-selection matrix outlining key criteria to help guide the selection of possible sectors to be included in the study. The pre-selection matrix followed the sectors outlined in the background paper developed by the Ministry of Labour and Employment for the workshop on Green Jobs held in July 2008. Based on the findings of the pre-selection matrix at the workshop, the consultants focused on three sectors: a) Renewable Energy; b) Waste Management; and c) Construction.

While developing the inventory on "Who is doing What" on the three sectors; Renewable Energy, Waste Management and Construction, a number of sub-sectors were considered to make the list user friendly and easy to understand. For convenience these three sectors were again divided into 8 (eight) sub-sectors, they are policy, legislations, project interventions, service, production & manufacturing, finance & investments, External Support Agencies (ESA) and R &D under which potential green jobs are created through various projects and activities.

Policies are enforced by legislation and implemented through projects. Following this principle, on each sector, existing policies, legislation and project interventions were discussed to get a composite picture. Service providing agencies along with producers/ manufacturers were identified for each sector. Financing institutions were also included as they have an important role to play in promoting green jobs. ESAs are found to promote green jobs indirectly through different projects in the country. Roles of the research and development agencies and NGOs in raising awareness on each sector are also noteworthy to mention.

A number of activities were carried out during this assignment:

1. Development of a Pre-selection Matrix for assessment of sector potential to create green jobs based on secondary data.  
Pre- selection matrix (see annex 4) based on four specific criteria, they are;
  - Whether the activity takes consideration of occupational health, safety & environmental (OHSE) issues?
  - Whether the activity reduces Green House Gas (GHG) emissions at the present situation?

- How much jobs are created from the activity?
  - What is the contribution to national GDP?
2. Selection of most potential sectors (Renewable Energy, Waste Management & Construction) and corresponding sub-sectors using the matrix for refined focus of the study.
  3. Development of a frame work of who is doing what related to green job in the sectors and sub-sectors. (see annex-5)
  4. Development and pre-testing of questionnaire for primary data collection. (annex-6)
  5. Field survey on who is doing what among the identified sub-sectors.
  6. Collation of data.
  7. Preparation of final report on preliminary assessment of renewable energy, waste management and construction sector.

During the preliminary assessment, a field level survey has been carried out which was focused to identify the initiatives, appraise the baseline situation and future potentials in quantifiable terms. However, an exhaustive assessment on the aforementioned sectors will come out during the second phase detailed study.

## **8.0 KEY FINDINGS**

### **8.1 Renewable Energy Sector**

Bangladesh Government has recently finalized the 'Renewable Energy Policy of Bangladesh 2008', where it is recognized that renewable energy is cost effective and sustainable energy source which should be promoted through proper guidelines. In the face of growing energy scarcity and climate change challenges, Bangladesh has a great potential to use renewable energy technologies and also generate green jobs. In order to identify the existing activities and future potentials in the renewable energy sector in Bangladesh, the sector had been divided into seven sub-sectors, namely;

1. Policy
2. Legislations
3. Project interventions
4. Production and manufacturing
5. Financing
6. External support agencies
7. Research & development

As per the consultant's understanding, different organizations who are working in the fields of renewable energy are related to the sub-sectors mentioned above. Through their projects and activities, these organizations are creating 'green jobs' or it will be safer to say jobs that have the potentials to become green. The activities and organizations identified in the study are categorized against these sub-sectors to present a 'who is doing what' scenario in the renewable energy sector in Bangladesh. (see annex 1.1). A separate list of organizations involved in this sector from secondary data but not surveyed in detail, is given in annex1.2.

#### **8.1.1 Policy:**

The main actors working at the policy level for promoting renewable energy sector are the Ministry of Energy and Mineral Resources, Ministry of Environment and Forest and the Planning Commission. Several policy documents and strategy papers recognizes the importance of environmentally sound energy generation and promotes renewable energy sector as a sustainable solution to growing energy demand and as a means to climate change adaptation; such as; National Energy Policy 1995, Power Policy 1995, Renewable Energy Policy of Bangladesh 2008, Environment Policy 1992, National Strategy for Accelerated Poverty Reduction II (FY 2009-11) etc. (Annex-1.1). So far no legislations were identified for this sector.

#### **8.1.2 Project interventions:**

Major Promoters of Renewable Energy Technologies (RET) in Bangladesh are;

- Local Government Engineering Department (LGED)
- Rural Electrification Board (REB)
- Bangladesh Power Development Board (BPDB)
- Infrastructure Development Company Ltd. (IDCOL)
- Different Non Government Organizations & Micro Financing Institutes

Four types of renewable projects interventions have been identified through field level and secondary data surveys; they are briefly described below;

##### **1. Solar energy**

Bangladesh is situated between 20.30 and 26.38 degrees north latitude and 88.04 and 92.44 degrees east which is an ideal location for solar energy utilization. Daily average solar radiation varies between

4 to 6.5 kWh per square meter. Maximum amount of radiation is available in the month of March-April and minimum on December-January.

There is a good prospect of harnessing solar power in Bangladesh. In a recent study conducted by Renewable Energy Research Centre, it is found that average solar radiation varies between 4 to 6.5 kWhm<sup>-2</sup>day<sup>-1</sup>. Maximum amounts of radiation are available in the month of March-April and minimum in December-January. Solar energy resource study map has illustrated prospect of solar radiation in Bangladesh. There are different organizations, entrepreneurs implementing solar energy program in Bangladesh.

So far in Bangladesh 15 Mw power being produced from Solar PV panels. By the 2012 one million house holds will be powered from solar PV panel and targeted to produce 50Mw power. (source: [www.reein.org](http://www.reein.org)).

Solar energy projects are found all over the country and can be divided into two types;

- a. Photovoltaic electricity generation projects
- b. Thermal projects.

## **2. Bio-energy**

- a. 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 odorless gas and burns with a clear blue flame without smoke. It produces more heat than kerosene, fuel wood, charcoal and dung-cakes. 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. Biogas can be used for other purposes such as electricity generation, refrigeration, space heating and running engines but higher amount gas will be required for these purposes. Family size biogas plant is appropriate only for the domestic use such as cooking and lighting. Infrastructure Development Company Limited (IDCOL) is implementing National Domestic Biogas and Manure Program (NDBMP) with support from GoB, SNV Netherlands and Kfw. Under the project, a total of 60,000 domestic sized biogas plants will be financed during the period 2006-2009.

- b. Biomass gasification for power generation

Biomass gasification is the thermo-chemical conversion of solid biomass into combustible gas mixtures. Sustainable Rural Energy (SRE) project of LGED and IDCOL is promoting and implementing power generation projects through biomass gasification technology.

Biomass gasification is viewed today as an alternative to conventional fuel. Biomass gasification is the process of converting solid fuels (rice husk, wood/ wood-waste, agricultural residues etc.) into a combustible gas mixture usually called the "Producer Gas" i.e. biomass materials are gasified to produce "Producer Gas". The technology can be used for both thermal applications and power generation.

The advantages of gasification are:

- It ensures efficient usage of traditional biomass products by converting it into a high quality, combustible gaseous fuel.
- Biomass gasification technology is environment friendly which significantly reduces environmental pollution caused by traditional usage of biomass products.
- Reasonable cost of energy/ power production to operate as a commercially viable entity.

Biomass is a renewable source and its application as a fuel does not result in net CO<sub>2</sub> emission because the CO<sub>2</sub> released during the conversion of biomass is equivalent to that which has been

absorbed by the biomass from the atmosphere. Thus, unlike fossil based fuels, it is a CO<sub>2</sub> neutral energy source.

c. Improved stove technology

The Institute of Fuel Research & Development (IFRD) of Bangladesh Council of Scientific & Industrial Research (BCSIR) has been pursuing R&D activities on “Stove Technology” to suit the need in respect of bio-mass fuel, shape of the cooking pot and cooking habit of the users. These models may be grouped into 3 categories: (i) improved stoves without chimney, (ii) Improved stoves with chimney, and (iii) Improved stoves with waste heat utilization. These improved stoves save 50-65% fuel as compared with the traditional ones and save cooking time.

### 3. Micro-hydro Projects

Flat topography of Bangladesh does not permit building of large scale storage of power generation. However, there are certain locations within the country where small hydropower stations could be set up. SRE has successfully demonstrated first micro-hydro power unit at Bamerchara, Chittagong. It's installed capacity was 10 kW but due to inadequate water head about 4kW power was generated. A study on prospective micro-hydro sites in the Chittagong Hill Tracts and other eight sites has identified an estimated capacity of 135kW in these areas. SRE is also promoting indigenous technologies of micro-hydro power generation.

BPDB has submitted the following Micro Hydro Projects to the Power Division for approval:

- 25 KW Micro Hydro Project at the Teesta Barrage
- 50kWp Micro Hydro Power Project at Barkal Upazila, Rangamati District.

### 4. Wind Energy

The hilly and coastal areas of Bangladesh have potential for wind energy generation. Sustainable Rural Energy project of LGED in collaboration with BUET is carrying out 'Wind energy resource mapping (WERM)' project which installed 20 wind monitoring stations throughout the country. Mean while SRE has installed some low cut-in speed wind mill to lift ground water and seven small wind turbines at the St. Martin's Island. BCSIR and Grameen Shakti are also involved in wind energy research.

#### 8.1.3 Service providing:

Service providers are those organizations who provides consultancy and maintenance services to design and implement any renewable energy development projects. For example Rahimafrooz is a private sector company who provides commercial services in designing custom made solutions, implementation and maintenance of solar energy projects. Gramen Shakti is also providing training and maintenance services through Grameen Technology Centers (GTC).

#### 8.1.4 Production and manufacturing:

Different NGOs and private entrepreneurs who are engaged in production and manufacturing of equipments and appliances used in renewable energy technology projects, are identified in this sub-sector. Among the more visible actors, Rahimafrooz Renewable Energy Ltd.& Energypac do the assembling , manufacturing and selling of Solar Home Systems(SHS), CFLs and electronic ballasts. Grameen Shakti manufactures and sells SHS, improved cook stoves. Annex 1.1 contains detail information about these actors. A separate list is given in annex1.3 containing names of organizations who are involved in manufacturing of related hard wares, who will be further explored in the second phase of the study.

### **8.1.5 Financing (local and external support agencies):**

Financing and investments in renewable energy projects are done by both local and external support agencies (ESAs). Bangladesh government has a 'Climate change Trust fund' of 300 crore taka for the current budget year of 2008- 2009. Other two local financing organizations are IDCOL and Grameen Shakti.

IDCOL promotes solar home systems (SHSs) under the Rural Electrification and Renewable Energy Development Project (REREDP). REREDP is being jointly financed by the IDA, Global Environment Facility (GEF), KfW, GTZ over 2002 to 2009. IDCOL's initial target was to fund 50,000 SHSs with financial assistance from the World Bank and GEF by the end of June 2008. The target has already been achieved in September 2005, 3 years ahead of schedule at a US \$ 2.0 million below estimated project cost. Now IDCOL has a revised target of financing 200,000 SHSs by year 2009 with additional assistance from the World Bank, KfW and GTZ.

IDCOL promotes Solar Home Systems (SHSs) under REREDP through 15 partner organizations. IDCOL is also implementing National Domestic Biogas and Manure Programme (NDBMP) with support from GoB, SNV Netherlands and KfW. Under the project a total of 60,000 domestic sized biogas plants will be financed during the period 2006-2009.

Grameen Shakti (GS) has used micro credit to develop a successful market based model to take renewable energy to rural people. There are credit support for solar home systems, biogas plant construction and improved cook stoves. For reaching the poorer community GS has initiated micro utility financial model which has 10,000 clients now.

UNDP, World Bank are the main external support agencies to finance projects under LGED's Sustainable Rural Energy Program (SRE) and projects of IDCOL. Other ESAs are GTZ, RENDEV, IDA, KfW, GEF, SNV etc.

### **8.1.6 Research & Development:**

Research and development of new and appropriate technologies are carried out by both government and non-government organizations the list of which is given in annex 1.1 with their relevant fields.

The Institute of Fuel Research & Development (IFRD) of Bangladesh Council of Scientific & Industrial Research (BCSIR) has been pursuing R&D activities on "Stove Technology" to suit the need in respect of bio-mass fuel, shape of the cooking pot and cooking habit of the users.

Feasibility study on R&D of Renewable Energy Solar, Wind, Micro-Mini Hydro) has been undertaken by the Institute of Fuel Research Development (IFRD), of BCSIR under this program, wind speed data have been collected in the following sites:

- Saint Martin (offshore island)
- Teknaf
- Meghnaghat, Dhaka

R & D on Solar thermal by BCSIR have developed the following solar thermal technologies:

- Reflector type solar cooker
- Absorber type solar cooker
- Cabinet type solar dryer
- Solar water heater

SRE project in collaboration with BUET and BIT, Chittagong, has taken up a study titled "Wind Energy Resource Mapping (WERM)". The study aims a systematic observation on wind regime in 20 different locations of the country.

## **8.2 Waste Management:**

Due to rapid increase of population and economic growth municipal authorities with their limited financial and technical know how are struggling with the staggering amount of municipal waste. Everyday, urban areas of Bangladesh generate 15000 tons of waste. A large portion (almost 50%) of this waste remains uncollected in the roads and the rest is collected and disposed in low lying areas in a crude way. They are following the conventional end-of- pipe solution to managing their waste based on simply collection-transportation and unsanitary crude dumping method. As result, posing serious threat to public health, contaminating drinking water, creating environmental pollution along with generating greenhouse gas from the unmanaged organic waste. A major portion of the waste is organic, more than 70% of the total generated waste and rest inorganic portion of the waste is extensive recycled by the informal sector in a unhygienic way.

Abundance of labor and lack of natural resource made recycling industry vibrant in Bangladesh. Bangladesh has good potential to convert this waste into resource and can generate thousands of green jobs. In order to identify the existing activities and future potentials in the waste management sector in Bangladesh, we have divided the sector into eight sub-sectors, namely;

1. Policy,
2. Legislation,
3. Project Intervention,
4. Service Providing,
5. Production and Manufacturing,
6. Financing and Investment,
7. External Supporting Agency, and
8. Research and Development.

The study shows that a significant number of initiatives linked with waste management are linked with pilot initiatives of composting or recycling of waste. Most of these projects are supported by ESA grants. Only recently a joint venture initiative for the first time in Bangladesh brought in foreign direct investment using Clean Development Mechanism (CDM) of the Kyoto Protocol. In this connection to mitigate Green House Gas (GHG) the government of Bangladesh has created a Designated National Authority (DNA) to promote projects linked with GHG reduction. Bangladesh is also promoting the concept of 3R (reduce, reuse and recycling of waste) to improve the present end-of-pipe conventional practice of dumping waste. This study shows that waste management sector has the potential to create thousands of new jobs from both from formal, private and informal sector. This sector has potential of creating decent green jobs with little efforts. The activities and organizations identified in the study are categorized against the aforementioned sub-sectors to develop an inventory of 'who is doing what' in the waste management sector in Bangladesh. (see annex 2).

### **8.2.1 Policy**

Very few policies can be linked with waste management to create green jobs. The main actors working at the policy level of waste management sector are; Ministry of Environment and Forests, Ministry of Local Government Rural Development & Cooperatives, Ministry of Agriculture and Ministry of Industries, Government of Bangladesh. Several policy documents and strategy papers recognize the importance of environmentally sound waste management and as a means to regulate disposal of solid wastes and industrial sludge and promote recycling and recovery of energy, biogas and bio-fertilizer. The National Strategy for Accelerated Poverty Reduction II (FY 2009 – 11), National Urban Sector Policy, 2006 (Draft) by Committee on Urban Local Governments (CULG), National Agriculture Policy , October 2008, Industrial Policy 2005 etc. are found to be potential policies to promote green jobs through waste management.

### **8.2.2 Legislation**

The main actors working at the legislation level for promoting waste management sector are; Ministry of Housing and Public Works, Ministry of Environment & Forests and Ministry of Labour & Employment. They have some rules, which recognize the importance of environmental issues, safety

and occupational health, labour welfare, waste water and sewerage treatment plant, composting plant etc.; such as; The Private Housing Project Land Development Rules- 2004, The Environment Conservation Act, 1995, The Factories Act, 1965 and the Labor Act, 2006 (Annex-2).

### **8.2.3 Project Intervention**

Significant number of projects with the potentials to create green jobs is composting or recycling based. Majority of these projects are supported by grants. Most of these pilots are being carried out all over the country by NGOs, CBOs, local government along with some private business initiative. Only recently, a joint venture company has invested FDI to improve the waste management sector using carbon trading. Apart from waste recycling projects, manufacturing industries both large and small are found to be promoting Environment Management System (EMS) within their establishment to reduce their carbon emission and promote cleaner technology.

### **8.2.4 Service Providing**

A number of NGOs, private sectors and ESAs are found to be providing their services in waste management sector. For example, Waste Concern, Waste Concern Consultants, Rahimafrooz Batteries Ltd., RUSTIC, PRISM Bangladesh, PRODIPAN, SAPNO, Bandhan Society, Prottoy, NOWZUAN, Dushtha Shasthya Kendra (DSK), Sylhet Partnership and CleanTech are providing service on waste management sector. Most of the organizations are involved with composting project. Through composting they ensure a clean environment, health and safety of the worker as well as the community, reduce GHG and improve the soil condition of Bangladesh.

### **8.2.5 Production and Manufacturing:**

Different Production and Manufacturing organizations are engaged in waste recycling. The industries are already trying to incorporate cleaner technology, occupational health and safety etc. These industries are mainly compost production facilities, inorganic waste recycling industries scattered all around the country.

### **8.2.6 Financing and Investment:**

Financing Banks are at present supporting large and medium private recycling industries in Bangladesh. For the first time the Dutch Bangla Bank Ltd. is financing WWR Bio Fertilizer Bangladesh Ltd. (a Dutch joint venture company), in a waste bio-fertilizer project using carbon fund from a foreign company.

### **8.2.7 External Supporting Agency**

Different External Supporting Agencies (ESA) are supporting in waste management sector. They are: United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF), Department of Agricultural Extension (DAE), United Nations Centre for Regional Development (UNCRD), Asia Urbs, European Union, Canadian International Development Agency (CIDA), Plan Bangladesh, RADOL, CARE Bangladesh, Winrock International, Food & Agricultural Organization (FAO), International Labour Organization (ILO), Swisscontact – Katalyst and Local Enterprise Investment Centre (LEIC), Managed by IDLC finance Limited.

### **8.2.8 Research and Development:**

It has been identified from the study that Waste Concern, Waste Concern Consultants and Bangladesh Centre for Advanced Studies (BCAS) are the research-based organization in waste management sector. They are working with waste management, cleaner energy, Industrial pollution control, Climate change and Clean Development Mechanism (CDM).

### **8.3 Construction Sector**

Construction industry is growing rapidly in the country and generating a significant number of employments for the poor. One statistic shows that buildings consume or are responsible for 40% of the world's total energy use and 35% of the world's CO2 emissions.

The study considered all activities linked with production of a green construction, which starts from the Architects/engineers/designers/service providers, producers/manufactures, policy makers etc. has the potentials to create green jobs.

The study considered the following areas under the construction sector for assessment of Green Jobs in comprehensive manner. The areas are shown below:

- infrastructure, repair and maintenance;
- public and private housing;
- non-residential public property (e.g. hospitals and schools);
- industrial (e.g. factories and processing plant) and commercial construction.

In other words, a green building or construction is an activity that encompasses conservation and low environmental cost as the basic feature of its design and construction for efficient use of energy and water to provide a healthy and quality conditions to its users.

#### **8.3.1 Policy:**

At present there is no specific policy for construction industry linked with green jobs. So far, about four policies are identified which can be directly linked with green jobs. For example, the 'National Strategy for Accelerated Poverty Reduction II (FY 2009 -11)' mentions about proper disposal of waste and industrial sludge which can reduce the emission of green house gas emission from decomposed waste. 'The National Land and Transport Policy 2004' also mentions about EIA, environment standards and promotes cleaner technology for the construction work which can be linked somehow with creation of green jobs. 'The Draft Energy Conservation Act 2008' is also encouraging the use of renewable energy for buildings in the country.

#### **8.3.2 Legislations:**

'The Bangladesh Labor Law 2006' gave special importance on occupational health and safety issue for labors, can significantly contribute in the promotion of health and safety of construction workers. Both, ECA, 1995 and ECR 1997 are addressing the importance of environmental impacts of building, structures and any polluting industries or any activities which will require environmental clearance from them. A number of legislations are passed from the Public Works Department which integrates environmental consideration. RAJUK has also a rule where use of fire wood for burning of bricks has been prohibited to avoid deforestation.

#### **8.3.3 Project Intervention:**

Very few projects in construction sector are found to be promoting the concept of Green Jobs in Bangladesh. Recently in the year 2008, the Department of Environment of the GoB has initiated a commendable initiative of Green Building. In this connection a 'National Workshop on Eco-housing/Green Building under Malé Declaration' was jointly organized by Department of Environment, Ministry of Environment and Forest, Bangladesh, Housing Building Research Institute (HBRI), Dhaka and UNEP RRC.AP. The aim was to acquire knowledge about environment –friendly energy efficient building practice and get a guideline on formulation of a national eco-housing guideline. The Housing and Building research Institute has taken the initiative to update the National Building Code 2006 where energy efficiency of buildings will be incorporated. HBRI is also piloting the concept of ecological village where approach will be green.

The 'Grameen Phone Headquarter Building' at Bashundhara of Telenor Group, has incorporated building features which promotes energy efficiency. For example they have introduced night soil and waste water treatment plant, waste water recycling for toilet flushing, rain water harvesting system, intelligent shading device to reduce exposure to sun and air conditioning load, energy efficient lights and bulbs etc. The building is under construction and is located at Bashundhara, Dhaka. Occupational Health and Safety for the construction workers is also introduced in the construction site. Very few building exists in the country which are promoting the concept adopted by the Grameen Phone Headquarter Building in Bangladesh by a multinational company.

The building of the METI School at Rudrapur in Dinajpur is designed as a low-cost and environment friendly complex, where local low cost materials are introduced. Apart from the building projects, two local organizations are found to be working with improving the status of occupational and health and safety issues in Bangladesh.

#### **8.3.4 Service Providing:**

Only one architectural firm and a construction firm are found to be involved in a single project (Grameen Phone Headquarter Building at Bashundhara). Presently, architects, engineers and builders are not at all aware about the concept of green construction/ green buildings. They can play a significant role to convert the present construction industry into a green industry thus creating green jobs.

The only recognized national builders associations like REHAB can play a role to influence their member developers to go for green construction to sustain their business in the long run and offer a better energy efficient product to the customers.

#### **8.3.5 Production & Manufacturing:**

Building Materials can play a vital role to reduce the carbon foot print of this earth. For example hollow bricks are found to have high insulation quality which helps the building to maintain a comfortable temperature and reduce energy cost to maintain a comfortable temperature. Only few local manufacturers are found in the country that produces energy efficient building products. Only 2 (two) hollow brick manufacturing factories are found who is producing a green building materials. Energy efficient technology, material and equipments are available today. For example energy efficient bulb, lifts, air conditioners, generators etc. can reduce significant amount of energy bills for a building.

#### **8.3.6 Financing and Investment:**

There is not fiscal policy in country to attract investors or financiers to invest in projects in the construction sector which can create green jobs. Although international banks are active in promoting projects which is green and less carbon footprints in US and European countries. The study found only one example by the Dutch Bangla Bank which is linked with the financing the composting project of WWR Bio Fertilizer Ltd. a joint venture company in Bangladesh using the Clean Development Mechanism under the Kyoto Protocol.

#### **8.3.7 External Support Agencies:**

UNEP is supporting a pilot project on green building in Bangladesh in partnership with the Department of Environment to promote the concept of eco-housing.

#### **8.3.8 Research & Development**

In the public sector, only one example of R&D in country. The HBRI of the GoB is carrying our research and experiments with eco-housing in the country. In private sector Waste Concern Consultants is found to be involved with promotion of Green.

## 9.0 CONCLUSIONS

- This study tried to present an exhaustive list of organizations which are creating employment that have potential to become green.
- This one month study on three sectors has identified a number of projects and activities which are adopting cleaner technologies and occupational health and safety measures.
- As 'green job' is a new concept in the context of Bangladesh, lack of awareness and knowledge along with the absence of definite government policies and incentives for the stakeholders is the main constraint for enabling the market to create green jobs.
- However, a significant number of projects and activities are found being implemented by both government and non-government organizations. These projects are using comparatively cleaner technologies and have potentials to create green jobs. Most of these activities are supported by ESAs and operated in a piloting scale. Till now large commercial investments are absent in these sectors..
- Due to time constraint and lack of easy access to information, number of jobs created by these projects/activities could not be presented properly. Till now partial information is available which can be gathered during the second stage of the study.
- Solar and Bio-energy projects are predominant among the renewable energy sector, which are implemented by public-private-ESA partnerships. Only mentionable commercial investment is done by Rahimafrooz Renewable Energy Ltd.
- Waste Concern is among the very few organizations carrying out research and implementing small-scale replications of municipal solid waste management projects in close partnership with the Government all over the country.
- There are several NGOs and CBOs working in small-scale waste management and recycling projects in waste management sector. The only example of large scale commercial joint venture carbon trading based investment in this sector is done by a WWR bio fertilizer Bangladesh Ltd.
- Among the three sectors, construction sector has experienced only few project interventions and investment which could generate green job. A small number of private companies are manufacturing building materials that are comparatively more energy efficient with an objective to achieve technical efficiency and profit maximization. The occupational health and safety under this sector is still remaining as an issue today which can be improved by promoting green jobs.

**Annex 1.1**  
**Green jobs in Renewable energy sector: Who is doing what**

ANNEX 1.1

Sub- Sector	Actors	Description	Key Information
Policy	Ministry of Power, Energy and Mineral Resources	National Energy Policy 1995	Ensures environmentally sound sustainable energy development causing minimum damage to environment.
		Power Policy 1995	Power sector to be environmentally sustainable and cost effective.
		Petroleum Policy 1995	Ensures safety and environmental protection.
		Private sector power generation policy 1996 Private sector small power plants policy 1997	Power Cell to facilitate development of private sector power projects. Small power plants to follow environmental standards.
		Renewable Energy Policy of Bangladesh 2008	Harness potential renewable energy resources and to develop sustainable energy by substituting non-renewable energy.
	Ministry of Environment and forest	Environment Policy 1992	Reduce and discourage use of polluting fuel; increase use of alternate energy; conserve country's existing and renewable energy; and conduct EIA for energy projects
		National Conservation Strategy (NCS) 1997	Disseminate alternative energy technologies and promote energy efficient technology.
		National Environment Management Action Plan (NEMAP)	Recommended development of alternate energy and raise awareness
		Bangladesh National Adaptation Programme of Action (NAPA)	

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	Planning Commission	Moving Ahead: National Strategy for Accelerated Poverty Reduction II (FY 2009-11)	Government to develop power and energy sector striking a composite balance of power, gas, coal, renewable energy and energy efficiency and conservation. Sustainable energy to be promoted as a strategic priority for poverty reduction. Main goal of Renewable Energy sector is to develop, disseminate, promote and extend RE technology to rural people
Project Intervention	Local Government Engineering Department (LGED)	Sustainable Rural Energy (SRE)Project <ul style="list-style-type: none"> <li>• Demonstration of diversified applications of renewable energy technologies</li> <li>• Capacity building through training on renewable energy technologies</li> <li>• Development of Renewable Energy Information Network (REIN) in Bangladesh.</li> </ul>	<ul style="list-style-type: none"> <li>• Solar photo voltaic systems for lighting, water pumping &amp; water heating</li> <li>• Family biogas project from cow dung</li> <li>• Family biogas project from poultry dropping</li> <li>• Family biogas project from human excreta</li> <li>• Water pumping windmills</li> <li>• Wind solar hybrid water pumping system</li> <li>• Wind Energy Resource Mapping(WERM)</li> <li>• Electricity generation from poultry litter</li> <li>• Improved cook stove</li> </ul> All of these projects replace the use of fossil fuel and reduce deforestation which ultimately lead to green house gas emission reduction.
	Rural Electrification Board(REB)	Solar Home Systems installation in remote rural areas	Total 1304 numbers of SHS is installed covering areas of 19 Palli Bidyutayan Shamity (PBS)  The cost of grid connection and power generation using fossil fuel is avoided.

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	Bangladesh Power Development Board(BPDB)	Implementation, training and research <ul style="list-style-type: none"> <li>• Micro Hydro energy</li> <li>• Solar energy</li> <li>• Wind energy</li> </ul>	BPDB is implementing Chittagong Hill Tracts Solar PV Electrification Project.  2344 Nos Solar System (Approved), 4437 (Consumer)  Aim of the project:  Replacement of diesel generators by Solar electricity generation systems in public buildings and facilities including street lighting & water pumping in the off-grid areas of the country.
	BCSIR, Institute of Fuel Research and Development	Biogas pilot plant project (1st and 2nd phase)	Under biogas pilot plant projects (Phase 1 and 2) implemented by IFRD of BCSIR, a total of about 22000 biogas plants constructed throughout the country .  People are using biogas for cooking, lighting and generation of electricity and the residues from biogas plants are being used as organic fertilizer for crop production
		Dissemination of Improved stoves	
	Bangladesh Rural Advancement Committee(BRAC)	Installation of solar home systems(SHS) with support from IDCOL WB/GEF/GTZ/Kfw	Until May 18, 2008 BRAC Foundation installed 36,631 Solar Home System with support from IDCOLWB/GEF/GTZ/Kfw.  Improved stove can reduce 50%of the need for wood for cooking by effective use of biomass. They reduce use of fossil fuel and consequent GHG emission.

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	Muslim Mission, Faridpur	Biomass gasifier stove for Cooking application	Reduces wood consumption upto 50%.
		Electricity generation from poultry waste	Installed power generation is 12KW
	Grameen Shakti	Wind-diesel hybrid system in cyclone centers	The objective is to provide electricity to promote micro enterprises in these shelters
		Solar power program	<p>More than 260,000 solar home systems have been installed throughout the country until November 2008. It plans to install one million SHS by 2012. (source: www. reein.org)</p> <ul style="list-style-type: none"> <li>• Access to solar power systems protects rural women from the health hazards of traditional kupa or hurricane lamps.</li> <li>• The use of solar home systems created direct and indirect scope for new income generation and employment opportunities.</li> </ul>
		Biogas program	<p>GS provides support for installing 6-20 m3 capacity biogas plants.</p> <ul style="list-style-type: none"> <li>• Produces clean and efficient fuel.</li> <li>• The plant byproduct, slurry, can be used as a high quality organic fertilizer.</li> <li>• Protects women and children from indoor air pollution.</li> <li>• Prevents deforestation</li> </ul>
		Improved cook stove (ICS) program	Constructed 16000 cook stoves through 1000 ICS technicians cum entrepreneurs.

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
		CDM projects	GS has initiated clean development mechanism(CDM) for; 1. Installation of SHS in Bangladesh. 2. Dissemination of biogas technology in rural households
	Srizony	Solar home system(SHS) Program Under Rural Electrification and Renewable Energy program (REREDP)	7014 nos. of SHS installed
	Thengamara Mahila Shabuj Shangha (TMSS)		1458 nos. of SHS installed
	COAST Trust		2632 nos. of SHS installed
	Center for Mass Education in Science (CMES)		2333 nos. of SHS installed
	Integrated Development Fund (IDF)		2597 nos. of SHS installed
	Shubashati		2284 nos. of SHS installed
	Upakulio Biddutayan O Mohila Unnayan Samity (UBOMUS)		5609 nos. of SHS installed
	Padakhep Manabik Unnayan Kendra (PMUK)		504 nos. of SHS installed
	Bangladesh Rural Integrated Development For Grub-Street Economy(BRIDGE)		4417 nos. of SHS installed
	MUKTI Cox's Bazar		311 nos. of SHS installed

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	Rural Services Foundation (RSF)		21292 nos. of SHS installed
	Hilful Fuzul Samaj Kalyan Sangstha (HFSKS)		4173 nos. of SHS installed
	Palli Daridra Bimochan Foundation (PDBF)		1528 nos. of SHS installed
	Dreams Power Ltd.	250 kW biomass based power plant project	IDCOL financed a 250 kW Biomass based power plant at Kapasia, Gazipur. IDCOL provided concessionary loans and grants to Dreams Power Private Limited (DPPL), the Project Sponsor, for setting up the plant. Total cost of this project is Tk. 2.50 crore. The plant uses locally available agricultural residues i.e. rice husk as fuel for power generation. Ankur Scientific Energy Technologies Pvt. Ltd, India is the equipment supplier of the project.
	Matuail Power Ltd.	A Landfill gas extraction project yet to be implemented at the Matuail Dump site near Dhaka city. This project is registered as a CDM project with UNFCCC.	The project is expected to produce 3MW electricity from landfill extracted gas.
Service Providing	Rahimafrooz Renewable Energy Ltd.	Installation and after sales service for solar solutions.	
	Grameen Shakti(GS)	Grameen technology center(GTC)	30 centers has been set up under a pilot program to scale up it's solar program, especially production of SHS accessories by manufacturing these locally. More than 1000 rural women have been trained as solar technicians GS plans to set up 105 GTCs by 2010.

Sub-Sectors	Actors	Description	Key information
Production/ Manufacturing	Rahimafrooz Renewable Energy Ltd. Corporate office: 1A Gulshan Avenue, Dhaka 1212, Bangladesh	solar solutions including home lighting, street lighting, heating systems, water pumps, Photo Voltaic (PV) centralized systems, drip irrigation systems, vaccine refrigeration, support for computer and other electronic systems	60,000 solar home systems have already been installed. Rahimafrooz Solar deals with the following solar products: <ul style="list-style-type: none"> <li>• Solar Water Heaters</li> <li>• Solar Emergency Lanterns</li> <li>• Yard Lighting</li> <li>• Solar Portable Lighting Kit</li> <li>• Solar Education Kit</li> </ul>
	Grameen Shakti Address: Grameen Bank Bhaban (19 <sup>th</sup> floor), Mirpur-2, Dhaka-1216, Bangladesh. Web: <a href="http://www.gshakti.org">www.gshakti.org</a>	<ul style="list-style-type: none"> <li>• Improved cook stoves</li> <li>• Solar Home Systems</li> </ul>	
	Energypac Corporate office: Jiban Bima Tower 11th floor, 10 Dilkusha C/A, Dhaka, Bangladesh Website: <a href="http://www.energypac-bd.com">www.energypac-bd.com</a>	Compact Fluorescent Lamp Electronic Ballast	Production capacity CFL: 20,00,000 Pcs EB: 10,00,000 Pcs CFLs generally use less power, have a longer rated life and reduce GHG emissions compared to regular incandescent lamps. Electronic ballasts help conserve electricity by using less in fluorescent lights.
	SUN' NRG Ltd. <a href="http://www.sun_nrg.org">www.sun_nrg.org</a>	Commercial entrepreneur for solar solutions	

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
Financing and Investment	GoB, MoEF	Climate Change Trust Fund	Tk. 300 crore in the current 2008-09 budget
	IDCOL	Rural Electrification and Renewable Energy Development Project (REREDP) jointly financed by IDA, GEF, KFW, GTZ and World Bank.	
		250 kW Biomass Based Power Plant Project	
		National Domestic Biogas and Manure Program (NDBMP) with support from GoB, SNV Netherlands & KFW.	
	Grameen Shakti	Credit support (micro utility financial model) for ; <ul style="list-style-type: none"> <li>• Solar Power Sytem Installation</li> <li>• Biogas plant construction</li> </ul>	Around 10,000 clients have availed the micro utility system. (source: presentation by M S Islam at Workshop on Green Job, July 2008)
External support agencies	UNDP	Sustainable Energy Programme (SEP)	SEP is aimed at enhancing equitable access to appropriate, reliable and affordable renewable energy services to reduce human and income poverty.
	GTZ	Renewable Energy and Energy Efficiency Programme	3.77 million 16 million Euro for Solar PV Electrification

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	World Bank	Loan & Credit( Grace period = 10 years; Maturity = 40 years) * (Initially) 47 million US \$ for Solar PV Electrification( 2002-2005)	Executing agency: IDCOL Project: Rural Electrification and Renewable Energy Development Project
	RENDEV	Micro financing for access to renewable energy for rural population: -Solar Energy Technology -Small & medium size Enterprise development	Sponsored by European Commission: EACI Executing agency: Grameen Shakti
	KfW	Solar Home System & promotion of domestic biogas plants	Executing agency :Infrastructure Development Company Limited ( IDCOL) * 16 million Euro for Solar PV Programme * 8.6 million Euro for Biogas
	GEF	GEF Trust Fund/ GEF Grant Solar Home Lighting System for Rural Electrification and Renewable Energy Development	GEF agency: <a href="#">IBRD</a> - The World Bank Executing agency: REB & IDCOL
	<a href="#">International Development Association (IDA)</a>	Rural Electrification and Renewable Energy Development Project (REREDP).	Executing agency: IDCOL
	SNV	Biogas plant projects	Executing agency: IDCOL

ANNEX 1.1

Sub- Sector	Actors	Description	Key Information
Research & development	Bangladesh council of scientific and industrial Resarch (BCSIR)	Institute of Fuel Research and Development (IFRD) is actively engaged in R & D works on renewable energy and conservation of energy sources.	<ul style="list-style-type: none"> <li>• Stove technology</li> <li>• Fixed dome model biogas plant</li> </ul>
	Grameen Shakti	<p>The research programs have four distinct areas</p> <ul style="list-style-type: none"> <li>• Exploring ways to develop appropriate technologies and their uses</li> <li>• Developing ways to popularize and making the renewable energy systems easily accessible to a large number of households and institutions</li> <li>• Innovating financial services for the customers to facilitate rapid expansion of use of renewable energies</li> <li>• Developing and fabricating the solar accessories (charge controller, lamps, DC to DC converters etc.) locally in order to reduce the total system cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Grameen Shakti has already developed the following products at low cost                             <ul style="list-style-type: none"> <li>• Charge controller</li> <li>• DC-DC Converter</li> <li>• DC Ballast for fluorescent lamp</li> <li>• Mobile phone charger</li> </ul> </li> </ul>

Sub- Sector	Actors	Description	Key Information
	Bangladesh Center for Advanced Studies (BCAS)	<ul style="list-style-type: none"> <li>• Solar Photovoltaic systems in Bangladesh (BOOK)</li> <li>• Bangladesh Renewable Energy Newsletter (BREN)</li> <li>• Assessment of Energy Utilization and National Resource Management</li> <li>• Wind Energy Study (WEST) Project</li> <li>• Acceptability Studies of Solar PV Systems</li> <li>• Consultancy Services to Preparatory Installation of Solar Home Systems (SHS)</li> <li>• South Asia Regional Institute of Energy (SARI)</li> <li>• Grammen Shakti, Solar PV Project</li> <li>• Promotion of renewable Energy, Energy Efficiency and Green-house Gas Abatement (PREGA)</li> <li>• Promotion of Biogas Production and Use in Commercial Establishment (1st Phase)</li> <li>• Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement (PREGA-II)</li> <li>• Monitoring of REB Solar PV System in Narshingdi</li> <li>• Rural Electrification and Renewable Energy Development Project (REREDP)</li> </ul>	
	Bangladesh University of Engineering & Technology	Center for Energy Studies, BUET	Wave and Tidal Energy Research
		Institute of Appropriate Technologies, BUET	
	BIT, Chittagng	Wind Energy Resource Mapping (WERM)	

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	Bangladesh Renewable Energy Society (BRES)		
	National Committee for the Energy Conservation and use of Renewable Energy		
	Sustainable Energy Unit (SEU)	Sustainable Energy Unit (SEU) financed by UNDP	
	Bangladesh Solar Energy Society Renewable Energy Research Centre, Energy Park, University of Dhaka		
	Chittagong University of Engineering & Technology (CUET), Chittagong		
	Khulna University of Engineering & Technology (KUET), Khulna		
	Rajshahi University of Engineering & Technology (RUET), Rajshahi		
	Dhaka University of Engineering & Technology (DUET), Gazipur-Dhaka		

ANNEX 1.1			
Sub- Sector	Actors	Description	Key Information
	Islamic Institute of Technologies(IIT) Gazipur, Dhaka		
	Bangladesh Agriculture University, Mymensing		

**Annex 1.2**

**List of organizations involved in RE sector (detailed study not done)**

**List of Private Entrepreneurs and non government organizations working in Renewable energy sector in Bangladesh (Detail information will be verified in the 2<sup>nd</sup> phase field survey)**

ANNEX 1.2		
Sl.	Companies	Address
1	<a href="#">SIEMENS/Shell Solar (Bangladesh) Ltd.</a>	
2	<a href="#">Micro Electronics Ltd.</a>	
3	<a href="#">First Bangladesh Technologies Ltd (FBT)</a>	
4	Fair Trade International	
5	Singer Bangladesh Ltd.	
6	<a href="#">Associated Resource Management Co. (ARMCO)</a>	
7	<a href="#">UPACOL</a>	
8	Advanced Biogas Technology	House 153, Road 3, Mohammadpur Housing Society Mohammadpur, Dhaka-1207 Bangladesh Phone : +88-02-8120510, 912 1366 Email : <a href="mailto:advance@dhakacom.com">advance@dhakacom.com</a> Web: <a href="http://www.advancedbiogas.com">www.advancedbiogas.com</a>
9	Nooreya Biogas and Engineering	Nooria Manshion House 95/1, Dr. Kudrat-e-Khuda Road(New Elephant Road) Dhanmondi, Dhaka-1205 Bangladesh Phone : +88-02-8616458, 8625673 Mobile: +88-01711-821795
10	DESHA	Dar-Us-Shefa, 317 Jhenaidah Road, Majampur, PO Box-1, Kushtia-7000 Bangladesh

ANNEX 1.2		
Sl.	Companies	Address
		Phone : +88-071-71402, 54023, 71086 Mobile: +88-01711-217623, 01720-510213 Email : <a href="mailto:deshango@bttb.net.bd">deshango@bttb.net.bd</a>
11	RIMSO Battery & Co.	21/1 Court House Street, Dhaka-1100 Bangladesh Phone : +88-02-7115349, 7123143
12	Bangla CAT(Bangla Trac Limited)	Corporate Office : 4 Mohakhali C/A, Dhaka-1212, Bangladesh Tel: +88-02-8859812-3, 8831982 Fax: +88-02-8857650 E-mail : <a href="mailto:info@banglacat.com">info@banglacat.com</a> Web : <a href="http://www.banglacat.com">www.banglacat.com</a>
13	GS Brand Gas Saver	Jabeda Manshion( 3rd Floor) 119 Fokirapool Dhaka-1000 Bangladesh. Tel : 88-02-9332460,8114091 Mobile: +88-01711-529922
14	Rahman Renewable Energy Company	Professor Para Jaipurhat Bangladesh. Email : <a href="mailto:redwanoor@yahoo.com">redwanoor@yahoo.com</a> , <a href="mailto:redwanoor@gmail.com">redwanoor@gmail.com</a> Mobile: +88-01712-586110, 01713-768384, 01911-058095
15	Innovative Technologies Ltd( Solar Equipments)	Electronics Complex, BSCIS Room 302(5th Floor), Plot 1/1 Road no 03, Avenue 4, Section 7 Mirpur, Dhaka-1216, Bangladesh Email : <a href="mailto:noonhos@citechco.net">noonhos@citechco.net</a> Mobile: +88-01713-007490

**Annex 2**  
**Green jobs in Waste Management sector: Who is doing what**

ANNEX 2			
Sub-sector	Actors	Description	Key Information
Policy	Government of Bangladesh	<ul style="list-style-type: none"> <li>National Strategy for Accelerated Poverty Reduction II (FY 2009 – 11)</li> </ul>	<ul style="list-style-type: none"> <li>Strategy: Improving urban environment by protecting urban rivers, regulating disposal of solid wastes and industrial sludge.</li> </ul>
	Government of Bangladesh	<ul style="list-style-type: none"> <li>National Strategy for Accelerated Poverty Reduction II (FY 2009 – 11)</li> </ul>	<ul style="list-style-type: none"> <li>PRSP Policy Agenda (2009-2011): Develop the Environmental Management Programme.</li> </ul>
	Government of Bangladesh	<ul style="list-style-type: none"> <li>National Strategy for Accelerated Poverty Reduction II (FY 2009 – 11)</li> </ul>	<ul style="list-style-type: none"> <li>PRSP Policy Agenda (2009-2011): Develop pilot projects of integrated waste-to-energy, biogas and bio-fertilizer in major cities.</li> </ul>
	Government of Bangladesh	<ul style="list-style-type: none"> <li>National Strategy for Accelerated Poverty Reduction II (FY 2009 – 11)</li> </ul>	<ul style="list-style-type: none"> <li>PRSP Policy Agenda (2009-2011): Promote use organic compost.</li> </ul>
	Ministry of LGRD & Cooperatives	<ul style="list-style-type: none"> <li>National Urban Sector Policy, 2006 (Draft) by Committee on Urban Local Governments (CULG).</li> </ul>	<ul style="list-style-type: none"> <li>Recycling as a Means to Reduce Solid Waste Management Cost: Government support for recycling through imposing user fees for waste disposal, encouraging composting and formalizing the function of scavengers, can lead to considerable savings in the cost of processing solid wastes.</li> </ul>
	Ministry of Agriculture	<ul style="list-style-type: none"> <li>National Agriculture Policy , October 2008</li> </ul>	<ul style="list-style-type: none"> <li>The use of organic manure, bio-fertilizers and compost will be encouraged. Measures will be taken to upgrade agricultural extension, training and motivational work at the farmers' level so that the farmers can follow suitable cropping patterns to maintain the natural balance of soil nutrients.</li> </ul>
	Ministry of Industries	<ul style="list-style-type: none"> <li>Industrial Policy 2005</li> </ul>	<ul style="list-style-type: none"> <li>Provide assistance to waste management development in order to</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
			ensure proper waste minimization and waste removal and produce pollution-free goods.
<b>Legislation</b>	Ministry of Housing and Public Works	<ul style="list-style-type: none"> <li>The Private Housing Project Land Development Rules- 2004</li> </ul>	<ul style="list-style-type: none"> <li>In case of projects located outside DCC and DWASA jurisdiction, the entrepreneur will install "Waste Water &amp; Sewerage Treatment Plant", "Composting Plant" etc. on his or her own financing/cost/expenses.</li> </ul>
	Ministry of Environment & Forest	<ul style="list-style-type: none"> <li>The Environment Conservation Act, 1995</li> </ul>	<ul style="list-style-type: none"> <li>Safety</li> <li>Occupational health</li> <li>Labour welfare</li> <li>Child labour</li> <li>Women labour</li> <li>Employee organisation</li> <li>Environmental issues</li> </ul>
	Ministry of Labour & Employment	<ul style="list-style-type: none"> <li>The Factories Act, 1965</li> </ul>	<ul style="list-style-type: none"> <li>Safety</li> <li>Occupational health</li> <li>Labour welfare</li> <li>Child labour</li> <li>Women labour</li> <li>Employee organisation</li> <li>Environmental issues</li> </ul>
<b>Project Intervention</b>	City Corporations & Municipalities	<ul style="list-style-type: none"> <li>"Community Based Urban Solid Waste Management in Dhaka" under Sustainable Environment Management Program (SEMP), Supported by Ministry of Environment and Forest and UNDP.</li> <li>"Community Based Urban Solid Waste Management in Khulna" under Sustainable Environment Management Program (SEMP), Supported by Ministry of Environment and Forest and UNDP.</li> </ul>	<ul style="list-style-type: none"> <li>Waste management</li> <li>Composting</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
		<ul style="list-style-type: none"> <li>• “Pilot Schemes on the Solid Waste Management and Composting under the Environmental Sanitation, Hygiene and Water Supply in Urban Slums and Fringes Project (GoB-UNICEF)” in 3 City Corporations (Chittagong, Rajshahi and Barisal) and 8 Pourashavas (Mymensingh, Noakhali, Comilla, Bogra, Jessore, Patuakhali, Rangamati and Khagrachari).</li> <li>• Bangladesh Environment Management Programme (BEMP) with support from Canadian International Development Agency (CIDA) implemented municipal solid waste management and composting project in 5 municipalities of Bangladesh.</li> <li>• Solid Waste Management &amp; Composting in Tangail Pourashava and Narshingdi Pourashava funded by RADOL and operated by two local NGOs.</li> <li>• Solid Waste Management &amp; Composting in Jessore Pourashava and Tongi Pourashava funded by CARE Bangladesh.</li> <li>• Solid Waste Management &amp; Composting in Kushtia Pourashava through 3R principle.</li> </ul>	
	Rural Areas of Bangladesh	<ul style="list-style-type: none"> <li>• Winrock International replicated Waste Concern’s composting model in Domar under Nilphamari district, Debigonj under Panchagarh district, Ghoraghat under Dinajpur district, Dinajpur Sadar, Netrokona district, Bhaluka under Mymensingh district, Jessore Sadar, Jhenaidah district, Bonaripara under Gaibandha district, Serajgonj under Bogra district and Sathibari under Bogra district.</li> <li>• Department of Agricultural Extension with the support from Food &amp; Agricultural Organization (fund) and Waste Concern Consultants (technical assistance) implemented a project entitled “Special Programme for Food Security” in in Chokshinga, Arani, Bagha, Rajshahi.</li> </ul>	<ul style="list-style-type: none"> <li>• Waste management</li> <li>• Composting</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
	Department of Environment (DoE)	<ul style="list-style-type: none"> <li>Formulation of the National Strategy on Waste Reduce, Reuse and Recycle (3R) for Bangladesh.</li> <li>Solid Waste Management &amp; Composting in Kustia Pourashava through 3R principle.</li> </ul>	<ul style="list-style-type: none"> <li>Solid waste management</li> <li>Composting</li> </ul>
	Local Government Engineering Department (LGED)	<ul style="list-style-type: none"> <li>It is responsible for a number of development projects throughout the country covering physical interventions, service oriented interventions in water supply, sanitation and solid waste management, socio-economic development of slum dwellers and other development activities in the city corporations and municipalities.</li> <li>It assists the municipalities in implementation and provides technical assistance for water supply and sanitation related activities.</li> </ul>	<ul style="list-style-type: none"> <li>Solid waste management</li> <li>Technical assistance</li> </ul>
	Department of Public Health Engineering (DPHE)	<ul style="list-style-type: none"> <li>It gives municipalities technical assistance for water supply, sanitation, and drainage services in accordance with the National Policy for Safe Water Supply and Sanitation 1998.</li> <li>“Pilot Schemes on the Solid Waste Management and Composting under the Environmental Sanitation, Hygiene and Water Supply in Urban Slums and Fringes Project (GoB-UNICEF)” in 3 City Corporations (Chittagong, Rajshahi and Barisal) and 8 Pourashavas (Mymensingh, Noakhali, Comilla, Bogra, Jessore, Patuakhali, Rangamati and Khagrachari).</li> </ul>	<ul style="list-style-type: none"> <li>Solid waste management</li> <li>Composting</li> <li>Technical assistance</li> </ul>
	Department of Agricultural Extension (DAE)	Department of Agricultural Extension with the support from Food & Agricultural Organization (for funding) and Waste Concern Consultants (for technical assistance) implemented a project entitled “Special Programme for Food Security” in in Chokshinga, Arani, Bagha, Rajshahi.	<ul style="list-style-type: none"> <li>Waste management</li> <li>Composting</li> </ul>
	Department of Inspection for Factories and Establishments	<ul style="list-style-type: none"> <li>Government of Bangladesh through the Ministry of Labour and Employment and the Department of Inspection for Factories and Establishments, together with UNDP (for funding) and ILO (for technical assistance) is implementing the “safe and Environment Friendly Ship Recycling Project, BGD/03/005”</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring proper occupational safety condition,</li> <li>Workers’ health and welfare, and</li> <li>Environmental protection.</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
Service Providing	Waste Concern	It is a "Non for Profit" research and development arm of Waste Concern Group focusing on pilot projects on all types of waste and cleaner energy projects (especially solar and bio energy projects).	<ul style="list-style-type: none"> <li>Waste management project</li> <li>Cleaner energy project</li> </ul>
	Waste Concern Consultants	It is a "For Profit" consulting arm of Waste Concern Group. It provides consultancy and advisory services to low and middle-income countries on waste management (municipal/hazardous/industrial/human excreta), cleaner energy, industrial pollution control, sustainable human settlement planning, energy efficiency, climate change and Clean Development Mechanism (CDM) as well as environmental management.	<ul style="list-style-type: none"> <li>Waste management project,</li> <li>cleaner energy project,</li> <li>Industrial pollution control,</li> <li>Sustainable human settlement planning,</li> <li>Energy efficiency,</li> <li>Climate change, and</li> <li>Clean Development Mechanism (CDM).</li> </ul>
	Rahimafrooz Batteries Ltd. (RBL)	ETP, ATP , Lead smelting, Wet & Acid fume Scrubber, ETP Sludge handling & Storage on-site & Launching "Hybrid CNG" Battery	<ul style="list-style-type: none"> <li>Management of in-organic heavy material waste &amp; acidic effluent</li> </ul>
	RUSTIC (Rural Unfortunates Safety Talisman Illumination Cottage)	Municipal solid waste management and composting through recycling of kitchen waste in Khulna City Corporation.	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> </ul>
	PRODIPAN	<ul style="list-style-type: none"> <li>Municipal solid waste management and composting in Khulna City Corporation.</li> <li>Clinical waste management and safe disposal in Khulna City Corporation.</li> </ul>	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> <li>Clinical waste collection and management</li> </ul>
	PRISM	<ul style="list-style-type: none"> <li>Municipal solid waste management and composting through recycling of kitchen waste in Khulna City Corporation.</li> <li>Clinical waste management and disposal in Dhaka City Corporation.</li> </ul>	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> <li>Waste collection from clinic</li> <li>Management of clinical waste at Matuail dumpsite in Dhaka.</li> </ul>
	SAPNO	Municipal solid waste management and composting in Bogra Pourashava.	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> </ul>
	Bandhan Society	Municipal solid waste management and composting in Kishoreganj Pourashava.	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
	Prottoy	Municipal solid waste management and composting in Cox's Bazar Pourashava.	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> </ul>
	NOWZUAN	Municipal solid waste management and composting in Patiya Pourashava.	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> </ul>
	DSK	Dushtha Shasthya Kendra (DSK) a Bangladeshi NGO with the support from Plan Bangladesh (financial support) and Waste Concern (technical support) is replicating the Waste Concern's barrel compost model at Vashantek slum, Mirpur, Dhaka from 2004 under the project entitled "DSK-Plan WAT-SAN (EHP) Project".	<ul style="list-style-type: none"> <li>Composting from household waste</li> <li>Ensure a clean environment</li> </ul>
	Sylhet Partnership	Sylhet Partnership with the support from Asia Urbs and European Union implemented municipal solid waste management and composting in Sylhet City Corporation.	<ul style="list-style-type: none"> <li>House-to-house solid waste collection</li> <li>Composting</li> </ul>
	CleanTech	CleanTech is providing solid waste collection services with a number of collection and transfer vehicles. With most of the waste collected by CleanTech going to the government landfills, a supporting network of transfer stations provides an important link for efficient disposal. CleanTech has a number of strategically located transfer stations to consolidate and load waste from collection vehicles into long-haul trailers for transport to landfills.	<ul style="list-style-type: none"> <li>Health &amp; safety of the worker.</li> </ul>
<b>Production/ Manufacturing</b>	WWR Bio Fertilizer Bangladesh Ltd.	WWR Bio Fertilizer Bangladesh Ltd. (a joint venture company of Waste Concern in association with its Dutch partners) is the world's first compost plant commissioned under a Clean Development Mechanism project located in Bulta, Rupganj, Narayanganj. Under this project vegetable waste from Kawranbazar markets has been collected using project's own transport networks, and taken to compost plant built on a land owned by the project without any investments from the government. An agreement has been signed between WWR Bio Fertilizer Bangladesh Ltd. and Dhaka City Corporation (DCC) to collect wastes from DCC area. The project will have two more	<p>The main objective of this project is:</p> <ul style="list-style-type: none"> <li>to reduce significant amount of tax payers money spent on waste management,</li> <li>to reduce environmental pollution,</li> <li>to create jobs for the urban poor,</li> <li>to reduce Green House Gas (GHG) and</li> <li>to improve the soil condition of Bangladesh.</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
		plants around Dhaka city within the year 2009 and this project will recycle 700 tons of organic waste everyday.	
	<ul style="list-style-type: none"> <li>Bengal Plastic, Unit #4</li> </ul>	Bengal Plastic, Unit #4 is a plastic-moulding factory producing plastic chairs, plastic tools, plastic dinning tables and case for carrying the beverage bottles. They are using virgin material as a raw material for producing its products. Sometime they mix their factory wastes with virgin resin after crushing. It is possible to mix this crushed material up to 15%. Beyond this figure the product quality will demean. The basic raw materials of BPW are PP homopolymer, PP co-polymer, HDPE, PVC (soft), a small amount of rubber and CaCO3 as filler. The intact raw materials are imported from Saudi Arabia, Malaysia, Singapore and India. The entire products of BPW are sold in local market.	Environmental Management System (EMS) incorporates: <ul style="list-style-type: none"> <li>Cleaner technology</li> <li>Occupational Health and safety,</li> </ul>
	Bengal Pacific (Pvt.) Ltd.	Bengal Pacific (pvt.) Ltd (BPL) is a joint venture company between managing partner of Australia and managing partner of Bangladesh government. BPL is producing different type of poly bags. The entire products of BPL are exported to Australia and England. They are exporting their products in two ways. One is direct export to foreign countries and other is deemed export. About 40% product of BPL is exporting directly and mainly that product is HDPE based. About 60% of total production, BPL is selling to local garments factories. Garments factories are wrapping up their products with this poly bags or poly films and exported to foreign countries.	Environmental Management System (EMS) incorporates: <ul style="list-style-type: none"> <li>Cleaner technology</li> <li>Occupational Health and safety,</li> </ul>
	Arbab Poly Pack Ltd (APPL)	Arbab Poly Pack Ltd (APPL) is producing poly film and printed packaging materials as per the specification of different brand companies like, Unilever, BATB etc. LDPE, BOPP, PET, MPET, MCPP and Al foil are main raw material of the factory. The entire raw materials are imported from abroad. All the products are consumed in the local market.	Environmental Management System (EMS) incorporates: <ul style="list-style-type: none"> <li>Cleaner technology</li> <li>Occupational Health and safety</li> </ul>

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Sub-sector	Actors	Description	Key Information
	Imran Plastic (IP)	Imran Plastic (IP) is a plastic moulding factory. Recycled plastic pellet is the main product of Imran Plastic. Factory wastes from the factory generating PP or HIPS type wastes and wastes from the waste dealer/vangriwala are used as raw material for producing its products. The basic raw materials of Imran Plastic are PP, HIPS wastes.	Environmental Management System (EMS) incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>
	Apollo Printing and Packaging (APP)	Apollo Printing and Packaging (APP) produces poly film or printed packaging materials as per the specification of different brand companies like, Prime salt, Fresh salt, TATA refined "maida", Lucky "chanachur" etc. using raw materials purchased from local market. All the products are consumed in the local market.	Capacity Building incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>
	B. R. P. Printing Works (BRPPW)	B. R. P. Printing Works (BRPPW) is a plastic industry producing different types of poly bags and printed packaging materials as per the specification of its clients. The entire products are consumed in the local market. Tripty Group, Ejab Group, Pubali Salt Industries Ltd., Titas Food Products Ltd. etc. are the clients of BRPPW.	Capacity Building incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>
	Luna Plastic Industries Ltd. (LPIL)	Luna Plastic Industries Ltd. (LPIL) is a plastic molding factory producing pharmaceutical small containers, PET bottles, spoons for pharmaceutical uses etc. They are using virgin material as a raw material for producing their products. Sometime they mix their factory wastes with virgin resin after crushing. It is possible to mix this crushed material up to 15%. Beyond this figure the product quality will demean. The basic raw materials of LPIL are PET, PP, HDPE (blow grade), HDPE (Injection grade), LDPE, PS and small amount LLDPE. The intact raw materials are imported from Saudi Arabia, Malaysia, Singapore and India. The entire products of Luna Plastic Industries Ltd. are consumed in local market.	Capacity Building incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>

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Sub-sector	Actors	Description	Key Information
	Navana Printing Works (NPW)	Navana Printing Works (NPW) is a plastic industry producing different types of poly bags and printed packaging materials as per the specification of its clients. About 60% of its products are consumed in the local market and rest 40 % is used for deemed export. These export quality packages are used for rapping fish, vegetables and dry foods which are to be exported to foreign countries. Some of its clients are Square Consumer Products Ltd., Coastal Seafoods Ltd., Euro Foods Group, Banga Agro Processing Ltd., Rupayan Dairy & Food Products Ltd., Nordic Seafood, Asiatic Sea Products Inc.	Capacity Building incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>
	Poly Cord Ltd.	Poly Cord Ltd. is producing poly film for packaging. Poly Cord Ltd. is doing the role of subcontractor of different brand companies like, Mahin standard suji, Keya lemon detergent powder, Keya super jet washing powder, Nabisco special slice milk bread etc. Poly Cord Ltd. is supplying the printed packaging material according to the specification or demand of the company. LDPE, BOPP, PET, MPET, MCPP and Al foils are main raw material of this factory. The entire raw materials are imported from India, Malaysia, Qatar, Saudi Arabia, Germany and Indonesia. Poly Cord Ltd. does not export their product.	Capacity Building incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>
	The Merchants Limited (TML)	The Merchants Limited (TML) is a plastic industry producing printing and packaging materials. The industry has two unit one is located at BSCIS Industrial State, Tongi, Gazipur (Unit # 1) and the another one is located at Kabi Jashimuddin Road, Pagar, Tongi, Gazipur (Unit # 2). In both of the units same type of products is produced. Main raw warehouse and the metalizing unit are located at Unit # 2. The incinerator is also established in unit # 2 used for burning wasted printed materials. TML produces PP films, LDPE films, LLDPE films, metalized films and printed packaging materials as per the specification of different brand companies like, Kohinoor Chemical Company (Bd) Ltd., Aventis Limited, GlaxoSmithKline Bangladesh Ltd., Banoful & Co. Ltd., BASF Bangladesh Ltd. etc. All the raw materials are purchased	Capacity Building incorporates: <ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational Health and safety,</li> </ul>

ANNEX 2			
Sub-sector	Actors	Description	Key Information
		from foreign countries. All the products are consumed in the local market.	
<b>Financing &amp; Investments</b>	Dutch Bangla Bank Ltd.	It is financing WWR Bio Fertilizer Bangladesh Ltd. (a joint venture company of Waste Concern in association with its Dutch partners), which is the world's first compost plant commissioned under a Clean Development Mechanism project located in Bulta, Rupganj, Narayanganj.	<p>The main objective of this project is:</p> <ul style="list-style-type: none"> <li>• to reduce environmental pollution,</li> <li>• to create jobs for the urban poor,</li> <li>• to reduce Green House Gas (GHG) and</li> <li>• to improve the soil condition of Bangladesh.</li> </ul>
<b>External Supporting Agency</b>	United Nations Development Programme (UNDP)	<ul style="list-style-type: none"> <li>• It supported for a project entitled "Community Based Urban Solid Waste Management in Dhaka" under Sustainable Environment Management Program (SEMP).</li> <li>• It supported for a project entitled "Community Based Urban Solid Waste Management in Khulna" under Sustainable Environment Management Program (SEMP).</li> <li>• It supported Government of Bangladesh through the Ministry of Labour and Employment and the Department of Inspection for Factories and Establishments, together with ILO (for technical assistance) for implementing the "safe and Environment Friendly Ship Recycling Project, BGD/03/005".</li> </ul>	<ul style="list-style-type: none"> <li>• House-to-house solid waste collection</li> <li>• Composting</li> </ul>
	United Nations Children's Fund (UNICEF)	It supported for a project entitled "Pilot Schemes on the Solid Waste Management and Composting under the Environmental Sanitation, Hygiene and Water Supply in Urban Slums and Fringes Project (GoB-UNICEF)" in 3 City Corporations (Chittagong, Rajshahi and Barisal) and 8 Pourashavas (Mymensingh, Noakhali, Comilla, Bogra, Jessore, Patuakhali, Rangamati and Khagrachari).	<ul style="list-style-type: none"> <li>• Solid waste management</li> <li>• Composting</li> </ul>
	United Nations Centre for Regional Development (UNCRD)	It is supporting a project entitled "Solid Waste Management & Composting in Kustia Pourashava through 3R principle".	<ul style="list-style-type: none"> <li>• Solid waste management</li> <li>• Composting</li> </ul>

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Sub-sector	Actors	Description	Key Information
	Asia Urbs and European Union	Asia Urbs and European Union funded Sylhet Partnership for the implementation of municipal solid waste management and composting in Sylhet City Corporation.	<ul style="list-style-type: none"> <li>• House-to-house solid waste collection</li> <li>• Composting</li> </ul>
	Canadian International Development Agency (CIDA)	Canadian International Development Agency (CIDA) funded Bangladesh Environment Management Programme (BEMP) for the implementation of municipal solid waste management and composting project in 5 municipalities of Bangladesh.	<ul style="list-style-type: none"> <li>• Solid waste management</li> <li>• Composting</li> </ul>
	RADOL	RADOL supported two local NGOs for Solid Waste Management & Composting in Tangail Pourashava and Narshingdi Pourashava.	<ul style="list-style-type: none"> <li>• Solid waste management</li> <li>• Composting</li> </ul>
	Plan Bangladesh	Dushtha Shasthya Kendra (DSK) a Bangladeshi NGO with the support from Plan Bangladesh (financial support) and Waste Concern (technical support) is replicating the Waste Concern's barrel compost model at Vashantek slum, Mirpur, Dhaka from 2004 under the project entitled "DSK-Plan WAT-SAN (EHP) Project".	<ul style="list-style-type: none"> <li>• Composting from household waste</li> <li>• Ensure a clean environment</li> </ul>
	Food & Agricultural Organization (FAO)	Department of Agricultural Extension with the support from Food & Agricultural Organization (for funding) and Waste Concern Consultants (for technical assistance) implemented a project entitled "Special Programme for Food Security" in in Chokshinga, Arani, Bagha, Rajshahi.	<ul style="list-style-type: none"> <li>• Waste management</li> <li>• Composting</li> </ul>
	CARE Bangladesh	CARE Bangladesh supported Jessore Pourashava and Tongi Pourashava for Solid Waste Management & Composting.	<ul style="list-style-type: none"> <li>• Solid waste management</li> <li>• Composting</li> </ul>
	Winrock International	Winrock International replicated Waste Concern's composting model in Domar under Nilphamari district, Debigonj under Panchagarh district, Ghoraghat under Dinajpur district, Dinajpur Sadar, Netrokona district, Bhaluka under Mymensingh district, Jessore Sadar, Jhenaidah district, Bonaripara under Gaibandha district, Serajgonj under Bogra district and Sathibari under Bogra district.	<ul style="list-style-type: none"> <li>• Waste management</li> <li>• Composting</li> </ul>

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Sub-sector	Actors	Description	Key Information
	International Labour Organization (ILO)	It provided technical assistance Government of Bangladesh through the Ministry of Labour and Employment and the Department of Inspection for Factories and Establishments, together with UNDP (for funding) for implementing the "safe and Environment Friendly Ship Recycling Project, BGD/03/005".	<ul style="list-style-type: none"> <li>• Ensuring proper occupational safety condition,</li> <li>• Workers' health and welfare, and</li> <li>• Environmental protection.</li> </ul>
	Swisscontact - Katalyst	<ul style="list-style-type: none"> <li>• Promotion of Environmental Management System (EMS) amongst Plastic Industries</li> <li>• Awareness Campaign for Source Separation of Plastic</li> <li>• Pilot Intervention for Collection of Source Separated Plastic Waste in Residential Areas of Dhaka City, and</li> <li>• Capacity Building Training Programs and Policy Intervention for Efficient Plastic Waste Recycling.</li> </ul>	<ul style="list-style-type: none"> <li>• Cleaner technology</li> <li>• Occupational health and safety</li> </ul>
	Local Enterprise Investment Centre (LEIC), Managed by IDLC finance Limited	<ul style="list-style-type: none"> <li>• Environmental Management Plan (EMP) for SMEs</li> </ul>	Environmental Management Plan (EMP) incorporates: <ul style="list-style-type: none"> <li>• Increase energy efficiency</li> <li>• minimize wastage</li> <li>• better management of environmental pollution</li> <li>• reduce impact of natural and man-made hazards</li> <li>• comply with occupational health and safety standards</li> <li>• comply with environmental standards.</li> </ul>
<b>Research &amp; Development</b>	Waste Concern	It is a "Non for Profit" research and development arm of Waste Concern Group focusing on pilot projects on all types of waste and cleaner energy projects (especially solar and bio energy projects).	<ul style="list-style-type: none"> <li>• Waste Management project</li> <li>• Cleaner energy project</li> </ul>
	Waste Concern Consultants	It is a "For Profit" consulting arm of Waste Concern Group. It provides consultancy and advisory services to low and middle-income countries on waste management (municipal/hazardous/ industrial/human excreta), cleaner energy, industrial pollution	<ul style="list-style-type: none"> <li>• Waste management project,</li> <li>• cleaner energy project,</li> <li>• Industrial pollution control,</li> </ul>

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Sub-sector	Actors	Description	Key Information
		control, sustainable human settlement planning, energy efficiency, climate change and Clean Development Mechanism (CDM) as well as environmental management.	<ul style="list-style-type: none"> <li>• Sustainable human settlement planning,</li> <li>• Energy efficiency,</li> <li>• Climate change, and</li> <li>• Clean Development Mechanism (CDM).</li> </ul>
	Bangladesh Centre for Advanced Studies (BCAS)	<ul style="list-style-type: none"> <li>• Refuse Quantity Assessment of Dhaka City Corporation. Waste to Electrical Energy Project (through biogas). July 1997-June 1998</li> <li>• Assessment of Energy Utilization and Natural Resources Management Practices in Kishoreganj Sadar Thana. January 1996-December 1997</li> <li>• Promotion of Biogas Production and Use in Commercial Establishment. June 2005- August 2005</li> </ul>	<ul style="list-style-type: none"> <li>• Power generation and fertilizer production from organic waste.</li> </ul>

**Annex 3**  
**Green jobs in Construction sector: Who is doing what**

ANNEX 3			
Sub- Sectors	Actors	Description	Key Information
<b>Policy</b>	Government of Bangladesh <a href="http://www.bangladesh.gov.bd">www.bangladesh.gov.bd</a>	National Strategy for Accelerated Poverty Reduction II (FY 2009 -11)	Strategies for urban development. Improving urban development by protecting urban rivers, regulating disposal of solid wastes and industrial sludge.
	Ministry of Communications <a href="http://www.moc.gov.bd">www.moc.gov.bd</a>	National Land Transport Policy, 2004	To well protect the environment from road construction programmes. <ul style="list-style-type: none"> <li>• Environmental impact assessment.</li> <li>• Fund for impact mitigation.</li> <li>• Environmental standards for new roads.</li> <li>• Long term sustainability in construction,</li> <li>• Avoid using clay bricks.</li> <li>• Open fires for heating bitumen will be banned.</li> </ul>
	Ministry of Environment & Forest <a href="http://www.moef.gov.bd">www.moef.gov.bd</a>	National Environment Policy 1992	
	Ministry of Housing and public Works <a href="http://www.mohpw.gov.bd">www.mohpw.gov.bd</a>	National Housing Policy 1993	
	Ministry of Power, Energy and mineral resources <a href="http://www.powerdivision.gov.bd">www.powerdivision.gov.bd</a> <a href="http://www.powercell.gov.bd">www.powercell.gov.bd</a>	Draft Energy Conservation Act 2008	<ul style="list-style-type: none"> <li>- Formation of a Department of energy conservation under the Ministry of Power, Energy and Mineral Resources.</li> <li>- Formulation of Building related energy code.</li> <li>- Encouraging the use of renewable energy in off grid areas and also to reduce environment pollution.</li> </ul>

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Sub- Sectors	Actors	Description	Key Information
			In order to promote energy efficiency and conservation, government will take steps for price reduction of efficient equipments and appliances and provide funds for research and development of new technologies.
Legislations	Ministry of Labour & Employment <a href="http://www.mole.gov.bd">www.mole.gov.bd</a>	Bangladesh Labour Law, 2006	Occupational health and safety issues for labors
	Department Of Environment <a href="http://www.doe-bd.org">www.doe-bd.org</a>	<ul style="list-style-type: none"> <li>- The Bangladesh Environment Conservation Act, 1995.</li> <li>- The Environment Conservation Rules, 1997</li> </ul>	DOE Core Functions & Activities: <ul style="list-style-type: none"> <li>- Planning &amp; Development</li> <li>- Documentation Centre</li> <li>- Compliance &amp; Enforcement</li> <li>- Environmental Awareness</li> <li>- Laboratory Analysis</li> <li>- Environmental Clearances and EIA Processing</li> </ul>
	Public Works Department <a href="http://www.pwd.gov.bd">www.pwd.gov.bd</a>	<ul style="list-style-type: none"> <li>- Building Construction Act 1952.</li> <li>- Bangladesh National Building Code,2006</li> <li>- Building Construction Rules 1996</li> <li>- Dhaka Metropolitan Building Construction Rules 2008</li> <li>- Private housing project land development Rules 2004</li> <li>- Open Space and Wetland Preservation Act, 2000</li> </ul>	The PWD takes all measures to protect Government interests regarding the environment by taking the following steps : <ol style="list-style-type: none"> <li>1. To integrate environmental considerations into housing and urban planning activities.</li> <li>2. To work in phases in gradually extending environmentally sound amenities to all existing urban and rural housing areas.</li> <li>3. To monitor and control housing and urban development schemes that may have an adverse impact on the local and overall natural environment.</li> </ol>

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			4. To accord greater importance to water bodies for their part in maintaining ecological balance and beautifying urban areas.
	RAJUK <a href="http://www.rajukdhaka.gov.bd">www.rajukdhaka.gov.bd</a>	Brick manufacturing rule 1989	The rule has forbidden the use of fire wood for brick burning.
<b>Project Interventions</b>	Department Of Environment	The National Workshop on Eco-housing/Green Building under Malé Declaration was jointly organized by Department of Environment, Ministry of Environment and Forest, Bangladesh, Housing Building Research Institute (HBRI), Dhaka and UNEP RRC.AP	The aim was to acquire knowledge about environment –friendly energy efficient building practice and get a guideline on formulation of a national eco-housing guideline.
	Housing and Building research Institute. <i>Address: 120/3 Darus-salam, Mirpur, Dhaka-1216</i>	Updating of Bangladesh National Building Code 2006	The updated version will incorporate ' building energy code' to ensure energy efficiency in buildings.
		Demonstration project: Sustainable house models for Bangladesh	The model comprises six prototypical house forms in an eco-village setting, developed within test conditions at the HBRI premises.
	Telenor Group	Grameen phone Headquarter building at Bashundhara.(under construction)	The on going building project incorporates; <ul style="list-style-type: none"> <li>• Night-soil and waste water treatment plant (STP &amp; WWTP)</li> <li>• Waste water recycling for flushing</li> <li>• Rain water harvesting system</li> <li>• Energy efficient and intelligent appliances for HVAC, lighting, shading and building materials.</li> </ul>

ANNEX 3			
Sub- Sectors	Actors	Description	Key Information
			<ul style="list-style-type: none"> <li>Construction workers' occupational health and safety.</li> </ul>
	METI School at Rudrapur, Dinajpur. Training and Research Society for Village Development.	<p>The project focuses on three strategies to implement new building methods: The construction of representative, public buildings to give a positive image to building with earth.</p> <p>The construction of residential buildings as a model for low-cost and environment-friendly housing.</p> <p>The training of local craftsmen and constructors as a basis for sustainable implementation.</p>	<p>Low costs, the use of local resources and innovative construction techniques have combined to produce an exemplary school in Rudrapur, Bangladesh. This six room school house was constructed of earth and bamboo; avoiding the implementation of imported constructional or technical complexities. The final constructional costs are approximately 50% lower than comparable buildings of brick, concrete or steel construction.</p>
	Bangladesh institute of labour Studies (BILS)	<p>BILS/OSHE Project. Funded by FNV/LO-FTF the project is now over. Presently follow-up activities are being implemented through small funds availed from different organisations like ILO and others.</p>	<p>Create awareness on OHSE issues in four selected sectors like- Construction, rice mills, match factory and electricity is the main activity of the project. The main objectives are:</p> <ol style="list-style-type: none"> <li>Ensuring a secured and safe work place for all</li> <li>Making the trade union members and the workers aware about the occupational hazards.</li> </ol>
	Bangladesh Occupational Safety, Health and Environment Foundation(OSHE)		
<b>Service providing</b>	Design consultant	Vistaara and Icon Architects <i>Address:</i>	Architectural consultancy to build an energy efficient office building for Grameen Phone

ANNEX 3			
Sub- Sectors	Actors	Description	Key Information
		<i>SE(H)6 Road 143, Gulshan Model Town, Dhaka 1212, Bangladesh</i>	(source: Information Department Grameenphone Ltd.)
	Contractors	Associated Builders Corporation ltd. <i>Address: ABC House (2nd floor) 8, Banani C/A, Kemal Ataturk Avenue, Dhaka</i>	Construction of energy efficient office building for Grameen Phone
Production & manufacturing	Concord Ready Mix concrete products. <i>Address: Concord Center 43, North Commercial Area Gulshan-2, Dhaka-1212, Bangladesh.</i>	Hollow concrete Block manufacturing	Unlike clay bricks, curing of concrete blocks do not need combustion of fossil fuel. Heat and noise insulating properties reduces insulation requirements. Requires less building material compared to conventional clay bricks.(source: manufacturer)
	Mirpur Ceramic Works Ltd. <i>Corporate office: House No. 1, Road No. 28, Banani Model Town, Dhaka-1213, Bangladesh. Ph. 9891942, 8821539, 8821109, 8860137 Fax. 880-2-8822026 E-mail: <a href="mailto:mcwho@dhaka.agni.com">mcwho@dhaka.agni.com</a>, <a href="mailto:info@mirpurceramic.com">info@mirpurceramic.com</a></i>	Hollow clay block	Higher thermal insulation properties. (source: manufacturer)
Financing & investments	-	-	-
External Support Agencies	United Nations Environment Program	UNEP RRC.AP jointly organized a national workshop on Eco-housing/Green Building under	Workshop's main objectives include: capacity-building and awareness-raising on eco-housing; sharing experiences and expert opinions to help

ANNEX 3			
Sub- Sectors	Actors	Description	Key Information
		Malé Declaration in Dhaka	formulate recommendations for policy dialogue; and dissemination of the eco-housing concept to the stakeholders.
Research & development	Housing and Building research Institute.	Eco-housing master plan	Eco housing integrates; <ul style="list-style-type: none"> <li>• Economic efficiency</li> <li>• Affordability by the users and executing authority.</li> <li>• Minimization and management of waste.</li> <li>• Resource conservation and proper utilization</li> <li>• Forest conservation.</li> <li>• Renewable energy.</li> <li>• Maintenance and access to community facilities.</li> </ul>
	Waste Concern Consultants Address: House-21(Side B), Road-7, Block-G, Banani Model Town, Dhaka- 1213, Bangladesh Ph: 880-2-9873002, +880-2-9873067, +880-2-9873110 Fax: +880-2-9884774 Email: <a href="mailto:office@wasteconcern.org">office@wasteconcern.org</a>	Energy efficient green building concept for proto type office buildings for Department of Environment, GoB.	

**Annex 4**  
**Sector Pre-selection Matrix**

	Employment Sectors (major industries identified in BBS '05-06)	Reduction of GHG emission Potential Activities/projects/programs	Health, Safety & Environmental conservation issues addressed			Total employment <sup>1</sup> (in million)	Contribution to GDP <sup>2</sup> (Billion Tk.)
			yes	no	partial		
1.	Agriculture, forestry & fisheries	Organic farming or any other activity minimizing harmful chemicals and pesticides			✓	22.77	625.8
2.	Mining and quarrying	-	-	-	-	.05	34.4
3.	Manufacturing	Environment friendly products, Waste Recycling, waste management			✓	5.22	513.7
4.	Electricity, Gas and water	Renewable energy technologies & equipments (solar, wind, biomass)			✓	.08	46.1
5.	Construction	Energy efficient design and building material		✓		1.52	267.9
6.	Trade, hotel and restaurant	Waste recycling, waste management			✓	7.82	437.2
7.	Transport, storage & communication	Use of CNG as fuel			✓	3.98	298.1
8.	Finance & business services and real estate	Investment in green projects	-	-	-	.74	275.2
9.	Health, education, public administration & defence	Awareness and practice of environment friendly waste management			✓	2.55	221.7
10.	Community and personal services	Environment friendly waste management practice			✓	2.62	207.7

1. Source: Key findings of Labour Force Survey 2005-06, BBS

2. Source: GDP of Bangladesh-2008, BBS

**Note:** The exhaustive list of activities, projects and programs in different sub-sectors will be finalized after carrying out the detailed second phase study.

Only some most visible examples are shown in this table.

**Annex 5**  
**Framework for who is doing what in the three pre-selected sectors**

Sub-sectors	Sectors		
	(1) Renewable Energy	(2)Waste Management	(3)Construction
Policy	Related Ministries , GoB	Related Ministries, GoB	Related Ministries , GoB
Legislation	Related Ministries, GoB	Related Ministries, GoB	Related Ministries , GoB
Project Intervention	Specific departments under ministry who act as regulatory and facilitator bodies. NGOs, CBOs	City Corporations, Specific departments under ministry who act as regulatory and facilitator bodies. NGOs, CBOs	City development authority, City corporation, Specific departments under ministry who act as regulatory and facilitator bodies. NGOs, CBOs
Service providing	Private sector companies, NGOs, CBOs	Private sector companies, CBOs, NGOs	Developer companies, Architectural Consulting firms, Construction Firms, Construction laborer organizations
Production and manufacturing	Private sector companies,	Private sector companies NGOs	Private sector entrepreneurs
Financing	Local Banks & Financial intermediaries	Banks, Financial intermediaries	Banks, Financial intermediaries
External support agencies (ESAs)	International donor agencies	International donor agencies	International donor agencies
Research & development	Government and non government research organizations working in technology development	Government and non government research organizations working in technology development	Government and non government research organizations working in technology development

**Note:** Primary data on detailed information about each actors shown in column 1,2 & 3.will be collected and analyzed in an uniform format (annex-1) . The findings will be presented as a draft version, as the final figures will be available after the second phase detail study.

**Annex 6**  
**Format for Questionnaire Survey**

**General Profile of Industries Creating Green Jobs:**

Industry Type	Name of the surveyed organization/ enterprise	Production Capacity/yr	Year of Estd.	No. of Beneficiaries	No. of Jobs created	Proportion of female	Any Occupational Health and Safety (OHS)* or PPE**Training provided	Barriers (Problems faced)	Development Opportunities