3 THE DOMINICAN REPUBLIC NATIONAL ACTION PLAN FOR CDM PROJECT DEVELOMENT

3.1 Objectives of the Action Plan

The Action Plan for CDM Project Development in the Dominican Republic is prepared for clarifying the course of actions to be taken for maximizing realization of CDM project development potential to serve for sustainable socio-economic development of the country. The Action Plan identifies the priority sectors of CDM project development with possible CDM project prototypes by sectors. Taking into the limited time up until the deadline of the 1st commitment period of the Kyoto Protocol shouldered by the ANNEX I countries, the Action Plan puts its priority on the sectors that have larger CDM project development potentials that can potentially be realized within the short-term.

Subsequently, based on the identification of priority sectors, the Study formulates the strategies and actions to be taken for CDM project promotion in respective sectors with the proposed time schedule of actions. It also includes recommendations regarding the capacity development of the National Office of CDM (ONMDL), CNCCMDL and their actions in coordination with other public and private stakeholders to further strengthen the national capacity of CDM project development in the Dominican Republic.

3.2 CDM Project Development Potentials and Priority

3.2.1 Decision Tree for determining the priority sectors/areas of CDM Project Development

The Study takes the 3 steps to determine the priority of CDM project development for this Action Plan as shown in the figure below.

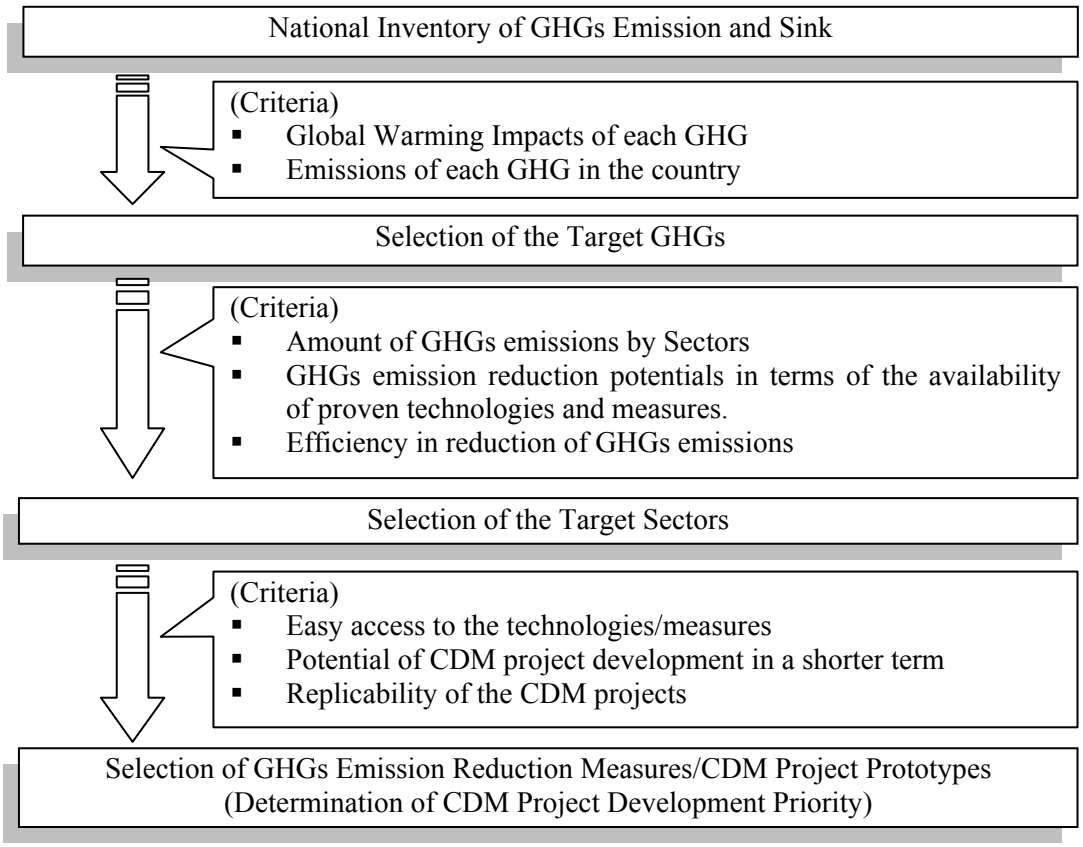

Figure 3-1: Decision Tree for Determination of CDM Project Development Priority

3.2.2 Target GHGs and Sectors

In general, the potentials of CDM projects exist in the sectors where there are opportunities of greenhouse gas reductions and/or sequestrations. In this respect, the national inventory data of GHG emissions and sinks can provide us the overall mechanism of GHG balance in the Dominican Republic. The table below shows the national inventory data in accordance with the 2nd national communication submitted to the United Nations in 2009.

Table 3-1: National Balance of GHGs Emission and Sinks (2000)

Unit: $GgCO_2e$

Source Categories	**CO_2**	**CH_4**	**N_2O**
National Total	-391.82	4,850.16	3,025.6
Energy	17,603.66	344.4	142.6
A) Energy combustion (Reference Approach)	**17,684.18**		
B) Energy Combustion (Sectoral Approach)	**17,596.74**	341.88	142.6
1 Energy industry	9,174.64	14.91	37.2
2 Manufacturing and Construction	1,038.02	16.17	34.1
3 Transport	5,980.44	32.34	170.5
4 Other Sectors	1,203.39	277.83	55.8
a) Commercial/Institutional			
b) Residential			
5 Others (Agriculture, Forestry and Fishery)	207.17	0.63	0.00
B Fugitive Emissions	NE	2.52	0.00
1 Coal Mining		0	
2 Oil and Natural Gas Extraction	NE	2.52	0.00
Industrial Process	811.06	0	0.00
A) Mineral Products	285.23		
B) Chemical Industry	NO	NO	NO
C) Metal Production	**525.83**		
D) Other Productions			
1 Pulp and Paper	NO	NO	NO
2 Food and Beverage			
Use of Solvents			
Agriculture	NO	2,942.1	2,759
A) Enteric Fermentation		**2,408.28**	
B) Manure Management		**212.10**	**1.24**
C) Rice Cultivation		**313.95**	
D) Flooded Paddy Field			**2,755.9**
E) Prescribed Savannah Burning	**NO**	**NO**	**NO**
F) Burning of Agricultural Residues		**7.56**	**3.1**
Land Use Change and Forestry	-18,808.57	13.23	1.24
A) Changes in Forest and Other Woody Biomass	**-21,514.13**		
B) Forest Conversion	**2,705.56**	**13.23**	**1.24**
C) Abandonment of Cultivated Lands	**NO**		
D) Emissions and Removals from the soils	**NE**		
Waste	2.03	1,550.43	120.9
A) Solid Waste Disposal		**695.73**	
B) Wastewater Treatment		**854.49**	**120.9**
1 Industrial Effluent		93.87	
2 Domestic and Commercial Wastewater		760.62	120.9
Waste Incineration	2.03		
Memo I			
International Bunkers	1,042.17	1.89	9.3
Air Transport	1,042.17	1.89	9.3
Maritime Transport	NE	NE	NE
CO_2 emission from Biomass	5,176.49		

NO: No occurrence. NE: Not estimated.

Remark: To avoid confusions with the original table in the 2nd National Communication, No revision is made on the original one.

Source: 2nd National Communication

In terms of the types of GHGs, CO_2 is the largest GHGs emission sources (approx. 18.4 million tons of CO_2 equivalent), followed by CH_4 (about 4.8 million tons of CO_2 equivalent) and N_2O (3 million tons of CO_2 equivalent).

Since there is almost no proven measures/technologies that can be applied as CDM projects in the area of N_2O reduction (The currently registered CDM projects in relation to N_2O reduction is in the chemical industry sector and not targets agriculture-based N_2O emissions.), **the possible target GHGs of emission reduction are CO_2 and CH_4.**

3.2.3 Target Sectors for GHGs Emission Reduction

According to the national balance of GHGs emission and sinks (2000), energy combustion (in this case fossil fuels combustion) is the single largest source of CO_2 emission (approx. 17.6 million tons), followed by the emissions from industrial process (0.8 million tons). Although the forest conversion is estimated to reduce the carbon sequestration capacity of the country by about 2.7 million tons of CO_2-equivalent, the total carbon sequestration balance in forest is still positive (net absorption of CO_2).

As to the distribution of CO_2 emission from energy combustion among the economic sectors, energy industry (mainly electricity sector) is the largest source of CO_2 emission from energy combustion with the annual emission of about 9.2 million tons, followed by transport sector (mainly from consumption of fuels for vehicles). The CO_2 emissions from energy combustion in manufacturing/construction and other sectors (mainly consisting of commercial and residential sectors) totally generate about 1.2 million tons.

In relation to industrial process GHGs emission, the emissions from mineral and metal industry is significant with the total CO_2 emission of 0.8 million tons. The industrial process emission from mineral industry mainly comes from lime production in cement industry while the industrial process emission from metal industry mainly originates from iron & steel industries.

As to the emission of CH_4, enteric fermentation from the livestock is the largest, followed by the emission from solid waste and domestic/commercial wastewater. CH_4 emission from rice cultivation is ranked as the 4th largest emission source of CH_4, followed by the emission from animal manure management.

The CH_4 emission from enteric fermentation depends upon the digestive process of livestock animals. Although several potential emission reduction measures such as the control of animal feed staff, they are still not proven technologies and measures. Likewise, the CH_4 emission from rice cultivation, which mainly comes from the flooded rice fields, does not have proven technologies and measures for its reduction although there are some scientific researches works are currently carried out. In view of the proven technologies and measures currently available

for CH_4 emission reduction, the opportunities are in waste/wastewater treatment and animal manure management.

From the discussions above, the target sectors of GHGs emission reduction and CDM projects are identified as follows:

Table 3-2: Target Sectors of GHGs Emission Reduction and CDM Projects

Types of GHGs	Sector	Sub-Sector
CO_2	Energy (Supply side)	▪ Electricity
	Energy (Demand side)	▪ Industry (manufacturing & construction) ▪ Transport ▪ Other sectors (Residential/ Business/ Commercial/Institutional
	Industrial Process	▪ Mineral Production (Cement Industry) ▪ Metal Production
CH_4	Agriculture	▪ Manure management
	Waste	▪ Solid Waste Disposal ▪ Wastewater Treatment

3.3 Target GHGs Emission Reduction Measures and CDM Project Prototypes

3.3.1 Energy (Supply Side)

According to the latest energy balance of the Dominican Republic of 2007 available in the International Energy Agency, the total primary energy supply by types of energy sources are as follows:

Table 3-3: Total Primary Energy Supply in the Dominican Republic (2007)

Unit: ktoe (thousand tons of oil equivalent)

Sources	Coal and Peat	Crude Oil	Petroleum Products	Gas	Hydro	Combustible Renewables and Waste	Total
TPES	520	1,772	3,694	366	120	1,419	7,892
%	6.6	22.5	46.8	4.6	1.5	18.0	100

Source: 2007 Energy Balance for Dominican Republic (IEA)

The percentage of renewable energy sources in the total primary energy supply is approximately 20% in the Dominican Republic while the remaining 80% is covered by fossil fuels. As most of these fossil fuels are imported, the economy in this country is seriously influenced by the international trend of fossil fuels market.

In power generation sector as well, dependence upon fossil fuels is outstanding as shown in the table below.

Table 3-4: Power Generation by Sources (2008)

Unit: GWh

Sources	Coal	Oil	Natural Gas	Hydro	Autoproducer	Total
GWh	2,033	5,755	2,429	1,390	144	11,751
%	17.3	49.0	20.7	11.8	1.2	100

Source: Memoria Annual 2008 (SENI)

In terms of GHGs emission reduction, the opportunities exist in increasing the use of low carbon-intensive fuels (coal>oil>natural gas) or renewable energy sources. However, in view of facilitating energy independence of the country through promotion of utilizing domestic energy sources, the priority of CDM project formulation should be given to development of renewable energy sources. Among the types of renewable energy sources, on the other hand, the priority of CDM project formulation should be given to wind, hydropower and biomass to make the best of their comparative advantages for short-term development as identified below. Although the country has considerable potentials of solar energy as well, its higher cost and technical difficulty in applying at medium and large scale are the limiting factor of its promotion in comparison with the renewable energy sources mentioned above.

Table 3-5: Comparative Advantages for Short-Term CDM Project Development in Wind, hydropower, and Biomass in Renewable Energy Sector

Renewables	Advantages
Wind	▪ Registered CDM project available (fast track for project documentation). ▪ National-wide map of wind power potential and other necessary data are available (fast track for identification of potential project locations). ▪ There are several key developers and stakeholders.
Hydropower	▪ Clear development plan is available (EGEHID). ▪ There are several key developers and stakeholders. ▪ Fast track for document preparation (Simple methodology for emission reduction calculation).
Biomass	▪ There are various on-going initiatives by private sector for biomass-related CDM projects. ▪ Baseline information on biomass energy potential is available (fast track for project identification). ▪ High interest of public and private sector stakeholders.

Remark: The information about the on-going initiatives, developers and stakeholders in relation to the renewable energy sources above is provided in the National CDM portfolio in the ANNEXES to this report.

Therefore, the target GHGs emission reduction measures in the energy supply sector should be focused on development of renewable energy-based power generation of wind, hydropower and biomass.

3.3.2 Energy (Demand Side)

Demand side of energy is mainly divided into three sectors, i.e. industry, transport, and other sectors. Other sectors include residential, business, commercial, and public services. The main sources of energy consumption in these sectors are outlined in the table below.

Table 3-6: Energy Demand Side Sectors and Sources of Energy Consumption

Sectors	CO_2 Emission (million tons/yr)	Sources of Energy Consumption
Industry	1.04	▪ Factories (for boiler fuels, electricity, back-up generators, etc.)
Transport	5.98	▪ Fuels for vehicles (automobiles, motorcycles) ▪ Trains (electricity)
Residential/Housing	1.20	▪ Fuel use in individual houses (gas for cooking, etc.) ▪ Electricity ▪ Diesel oil for back-up generators in apartments and houses
Business/Commercial/ Public Services		▪ Diesel oil for back-up generators ▪ Electricity

According to the 2007 Energy Balance for Dominican Republic, the energy consumption by each energy demand sector is as shown in the table below.

Table 3-7: Energy Consumption by Sectors and Fuel Sources (2007)

Unit: ktoe (thousand tons of oil equivalent)

Energy Types / Sectors	Coal/Peat	Petroleum Products	Natural Gas	Combustible Renewables and Waste	Electricity	Total
Industry	71	362	0	358	453	1,244
Transport	0	2,009	0	0	0	2,009
Residential	0	831	0	859	375	2,065
Business/ Commercial/ Public Services	0	49	0	0	163	211
Total	**71**	**3,251**	**0**	**1,217**	**991**	**5,529**

From the table above, industry sector is the only consumer of coal, the most carbon intensive fossil fuels. The conversion of this coal consumption to the lower carbon intensive fuels such as natural gas or biomass fuels will have significant impacts upon reduction of greenhouse gases emission.

As to the petroleum products, transport sector is the largest consumer, followed by residential sector. If total fuel conversion from oil to other lower or no carbon fuels such as compressed natural gas (CNG) can be made for the fuels for vehicles, its impact upon GHGs emission

reduction will be enormous. However, due to their dispersed number of small emission sources, it is difficult to conduct collective GHGs emission reduction measures for the privately owned vehicles. The potential collective measures to be taken for GHGs emission reduction in the transport sector includes fuel switching and energy efficiency for public transport means such as bases and taxis. Such collective measures can be developed under the scheme of the programmatic CDM.

As to residential as well as business/commercial/public services sectors, collective GHGs emission measures can be conducted by applying common energy efficiency technologies or devices to the buildings and/or apartments. Introduction of efficient lighting device, e.g. conversion from incandescent to fluorescent bulbs is an example of such measures that can be promoted under the scheme of programmatic CDM.

In the industry sector, since the scale of individual GHGs emission source is much bigger than the sectors above, the CDM project potentials can be investigated for each individual source, namely factory or industrial premise. A large potential of GHGs emission reduction exists in fuel switch and energy efficiency improvement in industrial heat production process, more specifically boilers and furnaces. Introduction of cogeneration will also contribute to reduction of GHGs emission through simultaneous efficiency improvement in fuel and electricity consumption.

From the discussions above, the target GHGs emission reduction measures and CDM Project prototypes can be outlined as follows:

Table 3-8: Target GHGs Emission Reduction Measures and CDM Project Prototypes

Sector	Types GHG Emission Reduction Measures	CDM Project Prototypes
Industry	▪ Fuel switch	▪ Conversion to low or no carbon intensive fuels (coal>oil>natural gas>biomass) in industrial boilers/furnaces.
	▪ Energy efficiency	▪ Conversion to high efficiency boilers/furnaces ▪ Introduction of co-generation system
Transport	▪ Fuel switch	▪ Collective application of fuel switch to public transport means (buses, taxis)
	▪ Energy efficiency	▪ Collective application/renewal of high efficiency engines for public transport means
Residential/ Business/ Commercial	▪ Energy efficiency	▪ Collective installation of energy efficiency device in buildings and apartments.

3.3.3 Industrial Process

The major sources of GHGs emission from industrial process in the Dominican Republic are cement and iron and steel industries. Since the number of these industries is limited, the potentials of GHGs emission reduction measures and CDM project development should be individually investigated and promoted. The table below shows the sources of process-based CO_2 emissions and potential reduction technologies and measures.

Table 3-9: Process-Based Emission Sources of CO_2 and Potential Reduction Technologies and Measures in Cement and Iron and Steel Industries

Industry	Process CO_2 emission sources	Potential CO_2 Reduction Technologies and Measures
Cement Industry	▪ **Thermal cracking of lime ($CaCO_3 \rightarrow CaO+CO_2$)**	▪ **Blended Cement (with blast-furnace slag, fly ash, etc.)**
Iron and Steel Industry	▪ **Blast furnace reduction of iron ore with cokes (iron making process)**	▪ **Increased use of scrapped iron**

As to the cement industry, process-based CO_2 emission can be reduced by lowering the use of lime in clinker production through conversion by alternative materials such as blast-furnace slag, fly ash, and so forth.

In the case of iron and steel industry, the use of coke for reduction of iron ore in the blast furnace inevitably produces CO_2. The use of scrapped iron can reduce the use of iron ore, thereby reduce this CO_2 emission. Although there are other emission reduction technologies and measures, they are still under the process of research and development.

3.3.4 Methane Emission Reduction in Agriculture and Waste Management Sector

Target CH_4 emission reduction measures and prototypes of CDM projects in agriculture and waste management sector is limited to the options as shown in the table below.

Table 3-10: Target Measures and Prototypes of CDM Projects in Methane Reduction

Sector	CH_4 emission Reduction Measures	CDM Project Prototypes
Agriculture (Manure management)	▪ Methane capture	▪ Methane capture and flaring or energy utilization in livestock farms with bio-digester (applicable for large, medium and small scale)
Solid Waste Disposal (Landfill)	▪ Methane capture	▪ Methane capture and flaring or energy utilization at final disposal landfills
	▪ Methane avoidance	▪ Composting of organic solid waste for methane avoidance - Mechanical composting for large-scale application

		- Manual/semi-manual composting for small-scale application
Wastewater treatment	▪ Methane capture	▪ Methane capture and flaring/energy utilization in treatment of the domestic and industrial wastewater with high organic content (palm oil industry, alcoholic industry, etc.)

3.3.5 Determination of CDM Project Development Priority

a. Selection of the Target GHGs

As mentioned in the previous section (3.2.2), the GHGs emission by types in the Dominican Republic is characterized as shown in the figure below.

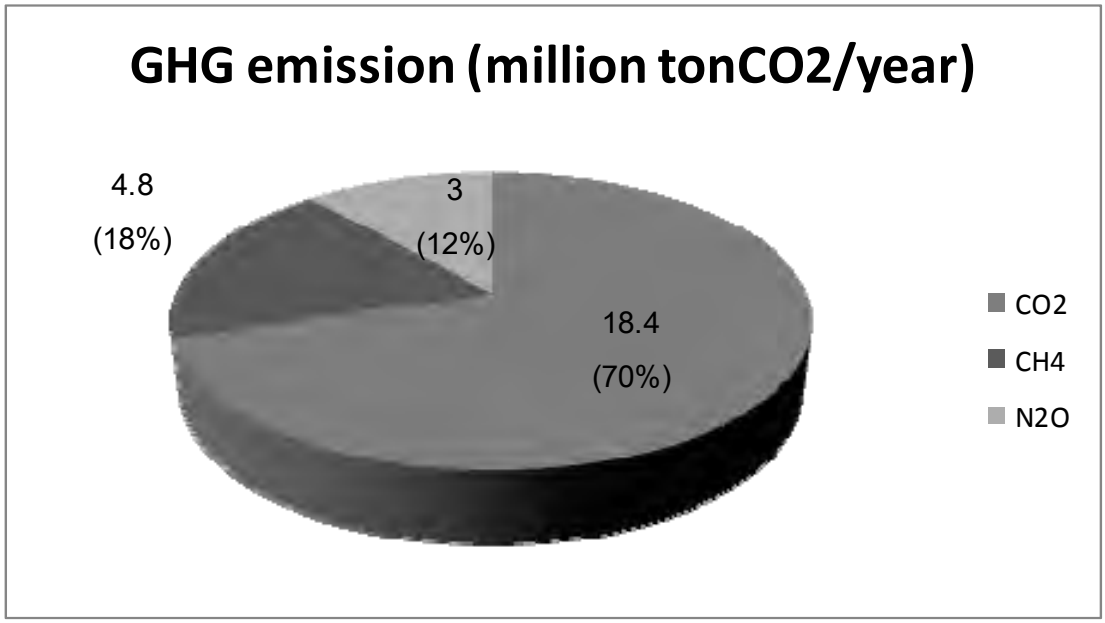

Figure 3-2: GHGs emission by Types in the Dominican Republic

Source: National Communication of the Dominican Republic (2009)

CO_2 and CH_4 totally cover 88% of the country's GHGs emission while the remaining 12% originates from N_2O. Taking into account that there are no prior registered CDM projects targeting the major sources of N_2O emission from flooded paddy fields, the target GHGs in this country will be CO_2 and CH_4.

b. Selection of the Target Sectors and Measures

b.1. CO_2 emission by Sector

The table below shows the distribution of CO_2 emission by sector in this country.

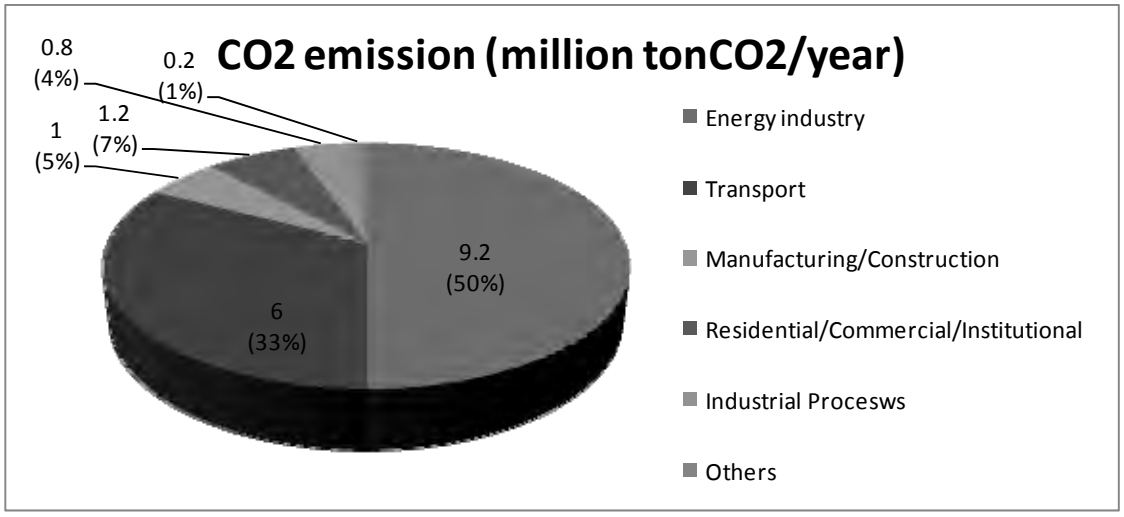

Figure 3-3: CO_2 Emission by Sector

Approximately 50% of CO_2 emission in the Dominican Republic comes from energy industry (mainly for power generation). Transport sector is the second largest sources of CO_2 emission, occupying about 33% of the country total. The remaining 17% is divided into other sectors including manufacturing/construction, residential/institutional/commercial, and so forth.

b.2. CH_4 emission by Sector

The sector-wise distribution of CH_4 emission is as shown in the table below.

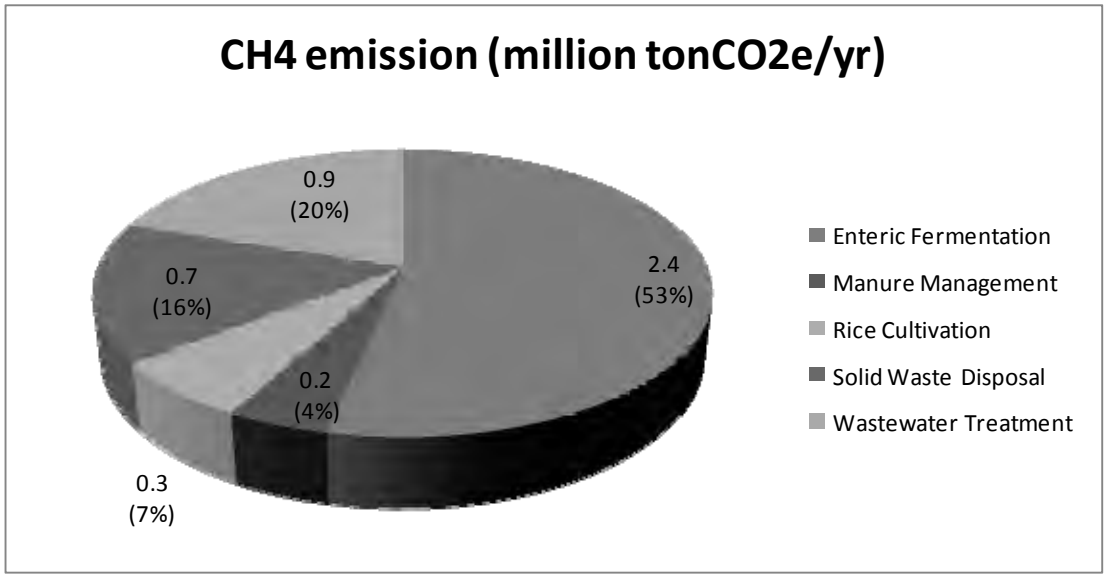

Figure 3-4: CH_4 Emission by Sources

Although the figure shows that enteric fermentation from livestock is the largest emission source of CH_4, there is virtually no measure available for its emission reduction. Therefore, the remaining 50% is the target of CH_4 emission reduction. In this respect, the major target sources of emission reduction are found in waste management sector including animal manure, solid waste and wastewater

Based on the above distribution of GHGs emission by sector and the further analyses made by sub-sectors in the previous sections of this chapter, the target sectors of CDM project development are identified as shown in the table below.

Table 3-11: Target Sources and Sectors of GHGs Emission Reduction

Types of GHGs	Sector	Sub-Sector
CO_2	Energy (Supply side)	▪ Electricity
	Energy (Demand side)	▪ Industry (manufacturing & construction) ▪ Transport ▪ Other sectors (Residential/ Business/ Commercial/Institutional
	Industrial Process	▪ Mineral Production (Cement Industry) ▪ Metal Production
CH_4	Agriculture	▪ Manure management
	Waste	▪ Solid Waste Disposal ▪ Wastewater Treatment

In addition, further analyses of the applicable GHGs emission reduction measures and technologies by sector and sub-sector in the previous sections, the CDM project development priority is determined by sectors and sub-sectors with the GHGs emission reduction measures as shown in the table below.

Table 3-12: CDM Project Development Priority by Sectors/Sub-sectors and Measures

Sector	Sub-Sector	Measures
Energy (Supply side)	Electricity	▪ Wind ▪ Hydropower ▪ Biomass
Energy (Demand side)	Industry	▪ Fuel switch (in industrial boilers/furnaces) ▪ Energy efficiency improvement (high efficiency boilers/furnaces, co-generation)
	Transport	▪ Fuel switch (collective application to public transport means) ▪ Energy efficiency (collective application of high efficiency engines to public transport means)
	Residential/Business /Commercial	▪ Energy efficiency (collective installation of energy efficiency device/measures in buildings and apartments, etc.)

Sector	Sub-Sector	Measures
Industrial Process		▪ Cement industry ▪ Iron and steel industry
Agriculture	Livestock	▪ Methane capture and flaring or energy utilization in livestock farms with bio-digesters
Waste	Solid Waste	▪ Methane capture and flaring or energy utilization at final disposal landfills ▪ Methane avoidance by composting of organic solid waste
Waste	Wastewater	▪ Methane capture and flaring or energy utilization in treatment of wastewater with high organic content (palm oil industry, distilleries, food and beverage, etc.)

3.4 Sector-Wise Strategies and Actions for CDM Project Development

3.4.1 CDM Project Development Strategy for Energy Sector

a. Supply Side in Energy Sector

As discussed in the previous section 3.3, the priority renewable energy sources for CDM project development are wind, hydropower and biomass. The recommended national strategies and actions for these priority renewable energy sources are discussed below.

a.1. Strategy for Development of Wind Power Projects

a.1.1 Identification of potential project areas based on GIS-based potential map

In accordance with the baseline geographical information on physical potentials of wind and national grid electricity network, the Study produces the wind power potential map shown in the figure below.

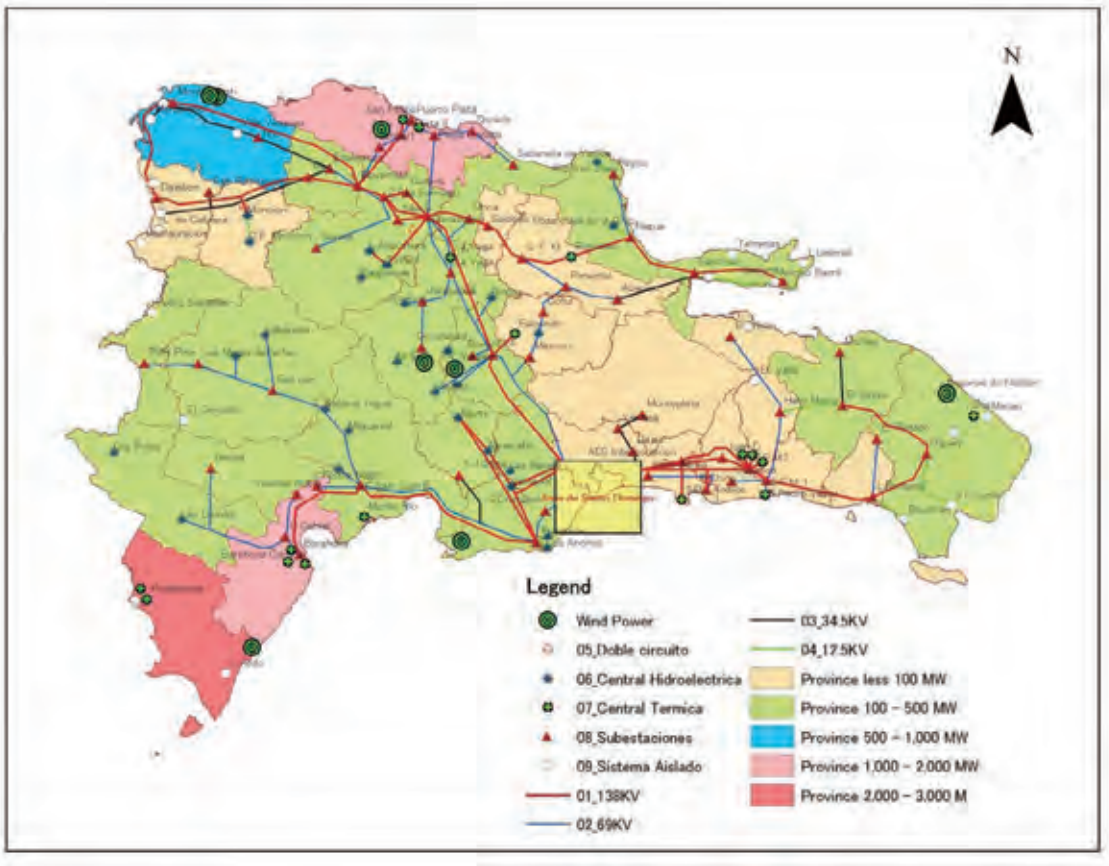

Figure 3-5: Potential Map of Wind Power Projects

From the figure above, significant potentials of wind power exist in the northern part of the country including the Province of Monte Cristi and Puerto Plata. Since the national grid electricity network is available at nearby area of wind power potentials, grid connected wind

power development can be developed as CDM project. On the other hand, in the case of wind power potential area in the southwestern part of the country such as Barahona and Pedernales, independent wind farm can be developed to supply electricity to nearby residents. In any case, based on the potential map produced here, we can narrow down the locations of wind farm development areas based on the physical potentials of wind, grid electricity network and distribution of potential users of electricity.

a.1.2 Policy coordination and consensus among the relevant public sector organizations

The development of wind power projects involves various public sector policies formulated by the relevant ministries and public sector organizations. Policy coordination and consensus among the relevant ministries and public sector organizations are important actions to facilitate the investment in this area. The key ministries and public sector organizations and their relevance to the development of wind power are illustrated in the table below.

Table 3-13: Key Ministries and Public Sector Organizations in Wind Power Projects

Key Ministries/organizations	Relevance to Wind Power Projects
National Energy Commission	▪ Support of wind power projects in view of National Energy Policy ▪ Provision of financial incentives based on Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes
Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technological coordination for connection to national grid from wind power plant/farm.
Dominican Corporation of State Electric Companies (CDEEE)	▪ Contract partners of power purchase agreement
Electrical Distribution Companies (EDE)	▪ Contract partners of power purchase agreement
Ministry of Environment and Natural Resources (MIMARENA)	▪ Evaluation on the compliance of the project with the relevant environment laws and regulations.
National Office of CDM (ONMDL), CNCCMDL	▪ Issuance of host country approval for CDM projects.

Policy coordination and consensus are also required with other ministries and/or governmental organizations if the project involves any conflict of interest over land use and/or development when locating the potential wind power development sites.

a.2. Strategy for Development of Hydropower Project

a.2.1 Identification of potential project areas based on GIS-based potential map

With the data of potential dam sites with their potential pondage and grid electricity network, the potential map below identifies the potential hydropower development areas in this country.

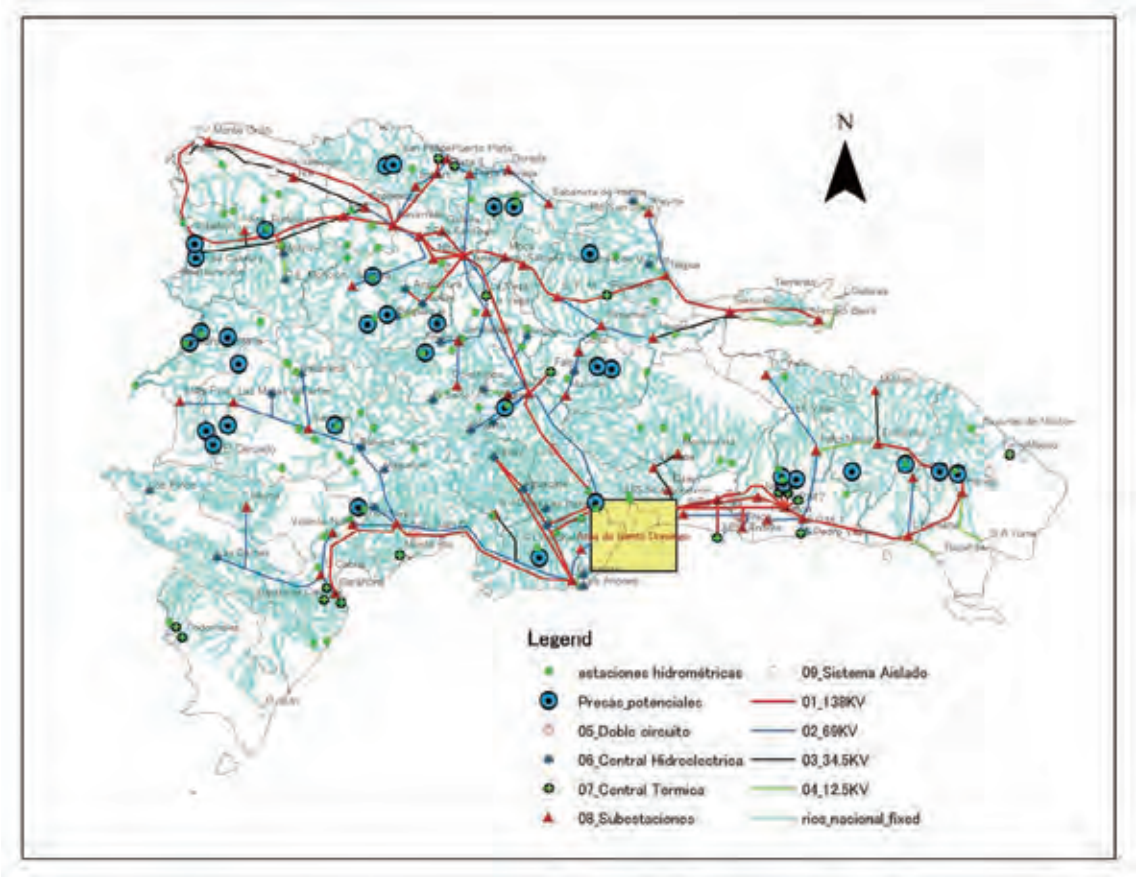

Figure 3-6: Potential Map of Hydropower Projects

In the case of hydropower projects, we can basically consider two options in the same way as of wind power, i.e. the medium and/or large scale grid connected hydropower and small-scale independent hydropower projects especially in the rural areas with no grid electricity supplied.

a.2.2 Policy coordination and consensus among the relevant public sector organizations

In the case of hydropower projects, the key ministries and public sector organizations with their relevance are as follows:

Table 3-14: Key Ministries and Public Sector Organizations in Hydropower Projects

Key Ministries/organizations	Relevance to Hydropower Projects
National Energy Commission	▪ Support of wind power projects in view of National Energy Policy ▪ Provision of financial incentives based on Law 57-07 on Renewable Sources of Energy Incentives and its Special

Key Ministries/organizations	Relevance to Hydropower Projects
	Regimes
Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technological coordination for connection to national grid from hydropower plant/farm.
Dominican Corporation of State Electric Companies (CDEEE)	▪ Contract partners of power purchase agreement
Electrical Distribution Companies (EDE)	▪ Contract partners of power purchase agreement
Dominican Hydropower Generation Company (EGEHID)	▪ Potential Developers of hydropower projects
National Institute of Hydraulic Resources (INDRHI)	▪ Provision of data on hydropower potentials (observation of river flow and collection of river water data)
Ministry of Environment and Natural Resources (MIMARENA)	▪ Evaluation on the compliance of the project with the relevant environment laws and regulations.
National Office of CDM (ONMDL), CNCCMDL	▪ Issuance of host country approval for CDM projects.

In developing the medium or large scale hydropower projects as CDM, we have to be careful about their potential impacts upon natural ecosystem as well as the surrounding residents. Since the EU-ETS, one of the biggest carbon credit trading markets in the world is very strict about the carbon credit arising from medium and large hydropower projects. It adopts the criteria and recommendations provided by the World Commission on Dams to make sure proper consideration of socio-environmental impacts in the project. Hydropower project will also be required to consider the potential conflict of water use with other potential water users and demand. The role of MIMARENA is of great importance in this respect to properly assess the impacts of the hydropower projects.

In the case of small-scale hydropower less than 15MW of installed capacity, the potential CERs obtained are sometimes (especially the micro-hydro power less than 100kw) not enough to develop and sustain the project itself while it is also difficult to cover the administration cost for project registration under CDM. In such a case, bundling of the projects or application of programmatic CDM should be considered since they enable the multiple number of similar projects to be registered with single project design document. The role of project coordinator or so-called CME (Coordinating/Managing Entity) is of great importance in properly organizing the multiple number of projects under these schemes.

a.3. Strategy for Development of Biomass Project

a.3.1 Identification of potential project areas based on GIS-based potential map

As to the potential of biomass energy projects, the potential map is produced for rice husk, coffee residue, coconut shell and sugarcane bagasse based on the available data and estimations by the Study as shown in the figure on next page.

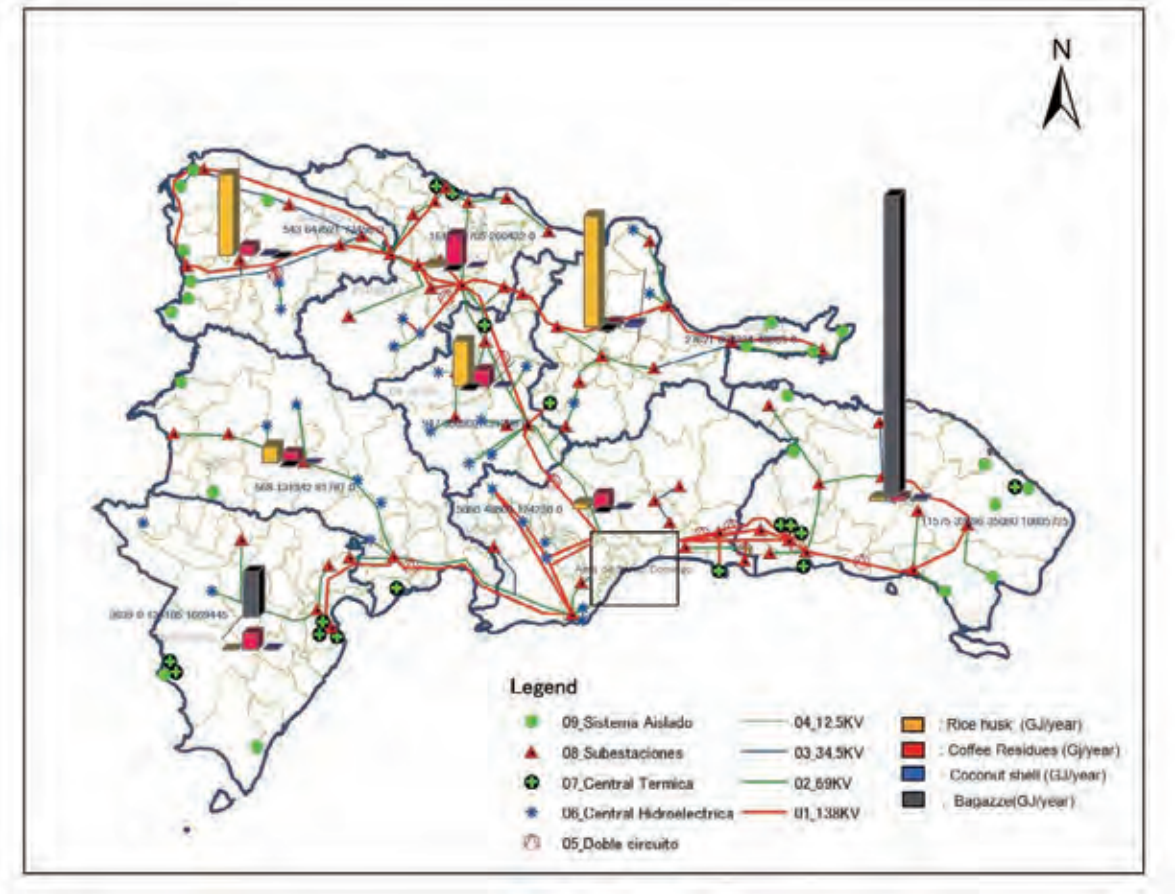

Figure 3-7: Potential Map of Biomass Energy Project

Since the biomass data is only available at region level, the amount of biomass can only be estimated by each region. However, we can still identify the current distribution of various biomass resources at regional level to identify their potential energy use. A large amount of sugarcane bagasse is produced in the eastern part of the country while rice husk is the major biomass source in the northern part of the country. Taking into account these distribution of biomass sources, we can formulate biomass energy development plan of the country.

There are two options of utilizing biomass sources for energy purpose. One is for biomass power generation and the other is the use of biomass as the fuel for heat production. Depending upon the distribution of grid electricity network and biomass sources, proper locations of biomass power generation projects can be determined from the potential map above.

As to the use of biomass sources as fuel, we have to identify the heat demand distribution over the country. As the major heat demand comes from industrial boilers and furnaces, the locations of factories with significant heat demand has to be identified for development of biomass fuel development projects.

In addition, further data collection is also required for other types of biomass, such as woodchip and residues, cacao husks, and other agricultural residues. Such data accumulation will increase the potentials and opportunities of developing biomass energy utilization in this country.

a.3.2 Policy coordination and consensus among the relevant public sector organizations

Biomass energy utilization projects involve various public sector organizations as shown in the table below. Proper policy coordination and consensus are a lot more important than other renewable projects.

Table 3-15: Key Ministries and Public Sector Organizations in Biomass Projects

Key Ministries/organizations	Relevance to Biomass Power Projects
National Energy Commission	▪ Support of biomass power projects in view of National Energy Policy ▪ Provision of financial incentives based on Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes
Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technological coordination for connection to national grid from biomass power plant/farm.
Dominican Corporation of State Electric Companies (CDEEE)	▪ Contract partners of power purchase agreement
Electrical Distribution Companies (EDE)	▪ Contract partners of power purchase agreement
Ministry of Agriculture	▪ Policy coordination for efficient use of biomass residues
Dominican Agrarian Institute	▪ Cooperation for development of biomass energy utilization technologies and measures
State Sugar Council	▪ Coordination for efficient use of sugarcane bagasse for energy purpose
Ministry of Industry and Commerce	▪ Coordination for matching the heat demand of industry with biomass energy utilization
Ministry of Environment and Natural Resources (MIMARENA)	▪ Evaluation on the compliance of the project with the relevant environment laws and regulations.
National Office of CDM (ONMDL), CNCCMDL	▪ Issuance of host country approval for CDM projects.

In the case of biomass energy utilization, cooperation with the private sector such as farmers, agri-business entities, and industrial enterprises is one of the important key of success in CDM project development.

b. Demand Side in Energy Sector

CDM project potential in demand side of energy sector targets 3 sectors, namely industry, transport and residential/business/commercial sectors while the types of GHGs emissions reduction measures are fuel switch and energy efficiency improvement.

b.1. Strategy for development of fuel switch and energy efficiency improvement projects in industry sector

The first step of identifying the potentials and opportunities of fuel switch and energy efficiency improvement in industry sector is to identify the current fuel and energy consumption in the industry sector of this country. Such activity needs to be carried out in cooperation with the Ministry of Industry and Commerce as well as key industry groups of the country. Based on the results of such investigations, we can target the types of industries and technologies/measures of fuel switching and/or energy efficiency improvement in the industry sector.

Considering the potentials of biomass and the importance of energy independence by promoting domestic energy sources in the country, fuel switch to biomass energy should be given the first priority of application to the industry sector in the form of electricity as well as fuel for heat production and supply. Depending upon its price competitiveness and availability, fuel switch to natural gas will also need to be considered as another option of GHGs emission in the industry.

As to the energy efficiency improvement, more opportunities exist in energy intensive industries represented by basic industrial material production such as iron and steel, mineral products, textiles, pulp and papers and so forth.

b.2. Strategy for development of fuel switch and energy efficiency improvement projects in transport sector

Due to dispersed sources of GHGs emission in transport sector, the opportunities of efficient GHGs emission are limited to collective application of fuel switch and energy efficiency improvement measures to public transport means such as buses and taxis. In this case, the involvement of public transport service companies is indispensable. However, due to the limited number of registered CDM projects and approved methodologies, it is difficult to target transport sectors as a short term action of CDM project development.

b.3. Strategy for development of energy efficiency improvement projects in residential/business/commercial sector

The CDM projects that have already been developed in residential/business/commercial sector are limited to several lighting energy efficiency improvement projects and a few energy-saving projects in buildings. Since there is an on-going initiative of introducing energy efficiency lighting in this country, expansion of this initiative is an option in this sector. In addition, application of efficient lighting can also be collectively introduced to office and commercial buildings. In any case, the opportunity of CDM project development in this sector is limited unless the GHGs emission technologies and measures are collectively introduced to multiple buildings. Involvement of multiple stakeholders is a critical factor of developing the CDM projects in this sector.

3.4.2 CDM Project Development Strategy for Industrial Process GHGs Emission Reduction

As previously mentioned in Section 3.3, the major sources of industrial process GHGs emission are limited in number and types of industry. Therefore, the basic strategy in this sector is to pinpoint the industries and sources of emission and discuss directly with the owners of industry about the possibility of implementing GHGs emission reduction as CDM projects. Such industry includes iron & steel and cement industries. Since the sources of GHGs emission are unique depending upon the types of industry, piece-meal approach is required to investigate the opportunities of its reduction for each industry.

3.4.3 CDM Project Development Strategy for Methane Emission Reduction

a. Strategy for development of methane capture project from livestock manure management

In the agriculture sector, the major potential of methane emission reduction exists in animal manure management in cattle and swine farms in this country. However, due to the limited number of pigs owned by individual livestock farmers, the amount of methane that can be captured from individual farm is not enough (Usually multiple thousands of cattle or swine are at least required.) to cover the cost required for methane capture project under CDM. Therefore, the CDM project in this area has to involve multiple farmers to maximize the amount of methane reduction obtained. In this respect, application of a bundled or programmatic CDM needs to be developed in this sector. Bundling and programmatic CDM project needs a managing entity which coordinates the project activity carried out by each participating farmer so that methane emission reduction can be properly achieved to obtain carbon credit. The involvement of the entity that has the capacity of controlling and managing the pig farmers is the key of implementing the bundling and/or programmatic CDM project in this specific sector.

a.1. Selection of the pig farms suitable for methane capture from animal manure management

There are basic requirement to meet for application of methane capture from animal manure management, i.e.

- Pigs have to be managed under confined conditions;
- Animal manure is not discharged to the natural water resources (e.g. rivers and estuaries);
- The animal manure treatment lagoon must have the depth of at least 1 meter;
- The minimum retention time of animal manure in the treatment lagoon is greater than 1 month.

To develop the methane capture project from animal manure management, we have to identify the pig farms that comply with the conditions above.

a.2. Selection of the CDM project types

Depending upon the scale of pig farms, there are several options of methane capture and utilization technologies and measures. In the case of a large pig farms with multiple thousands of pigs, a single CDM project can be developed with the initial design of the project as shown in the figure below.

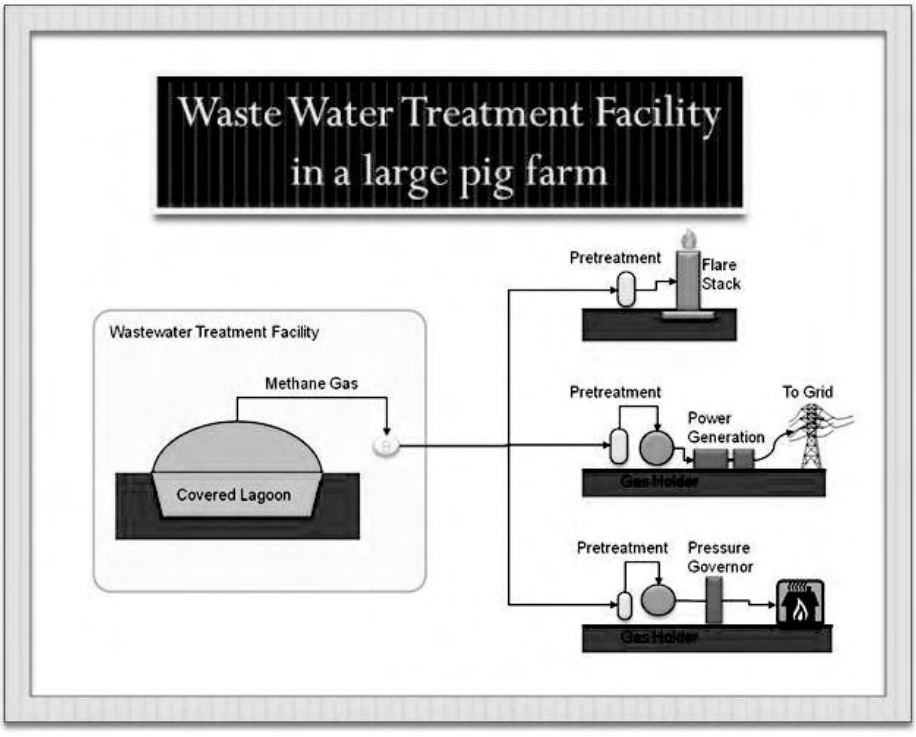

Figure 3-8: Conceptual Design of CH_4 Capture Project in a Large Pig Farm

On the other hand, for the small pig farmers, the CDM project can be developed as a bundled or programmatic ones involving multiple farmers with same methane capture and utilization technologies as shown in the following figures.

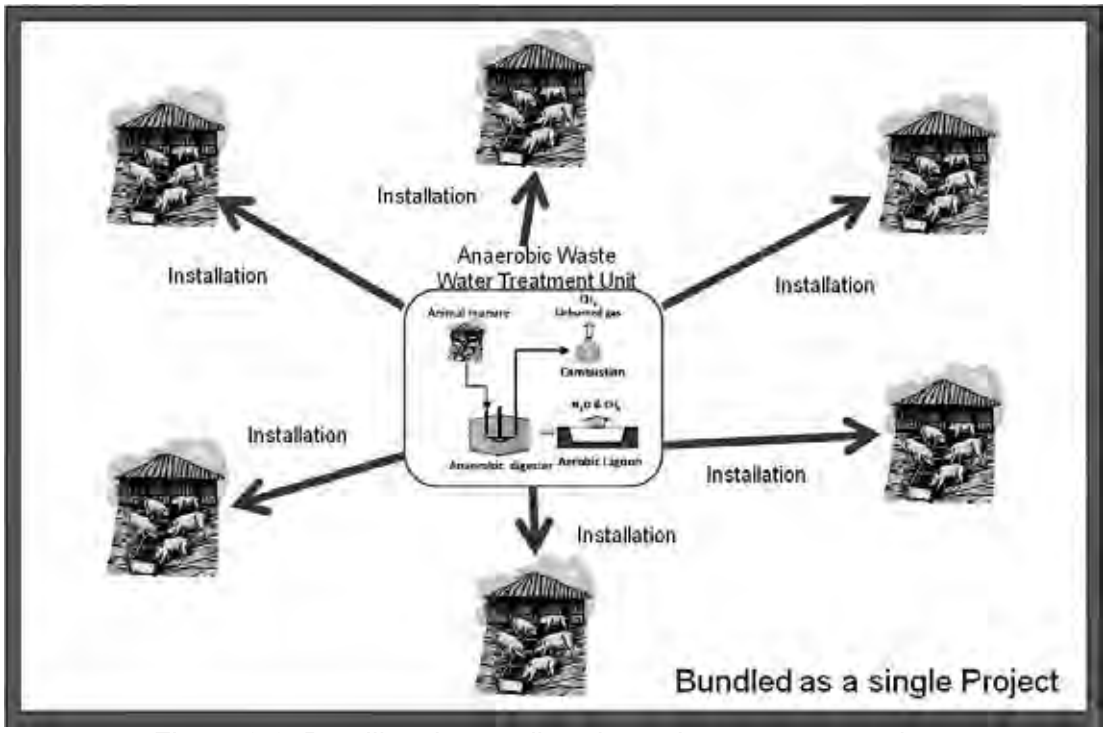

Figure 3-9: Bundling the small scale methane capture projects

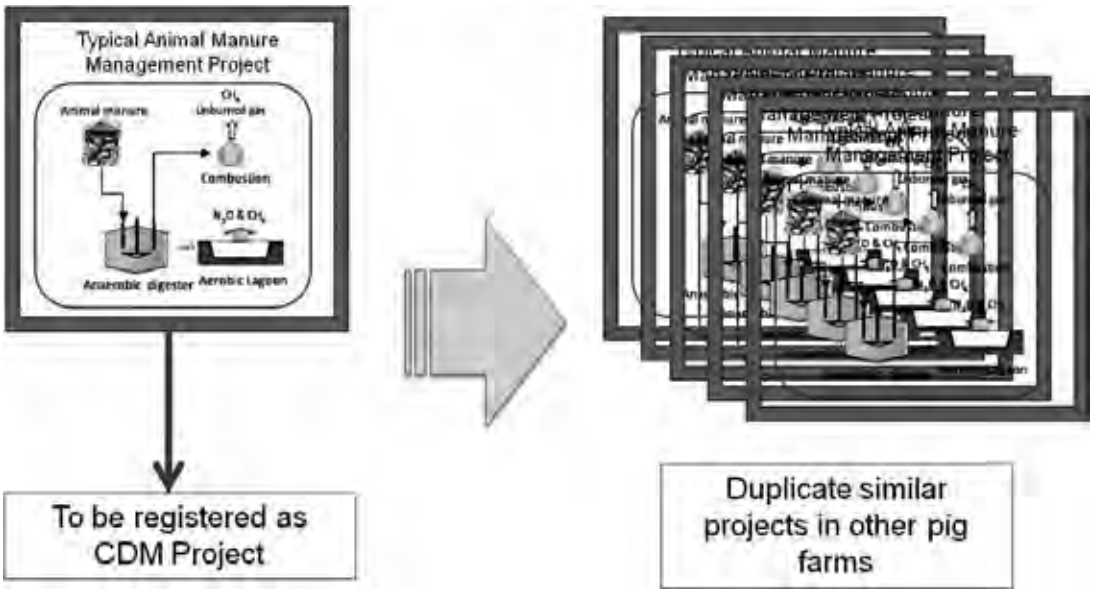

Figure 3-10: Programmatic CDM of the small scale methane capture projects

Taking into account the stricter conditions to be applied for bundling of multiple projects, the programmatic CDM should be applied for development of multiple methane capture projects for small scale farmers.

b. Strategy for development of methane capture project in solid waste management

In the sector of solid waste management, there are basically two options of GHGs emission reduction that can be developed as CDM projects, i.e. methane capture from landfill and methane avoidance by composting of organic waste. The potential of methane emission reduction depends upon the amount of organic waste generation and waste management practices.

b.1. Identification of potential project areas based on GIS-based potential map

Based on the population and per capita municipal waste generation, the Study produced the potential map of waste related methane emission reduction as shown below.

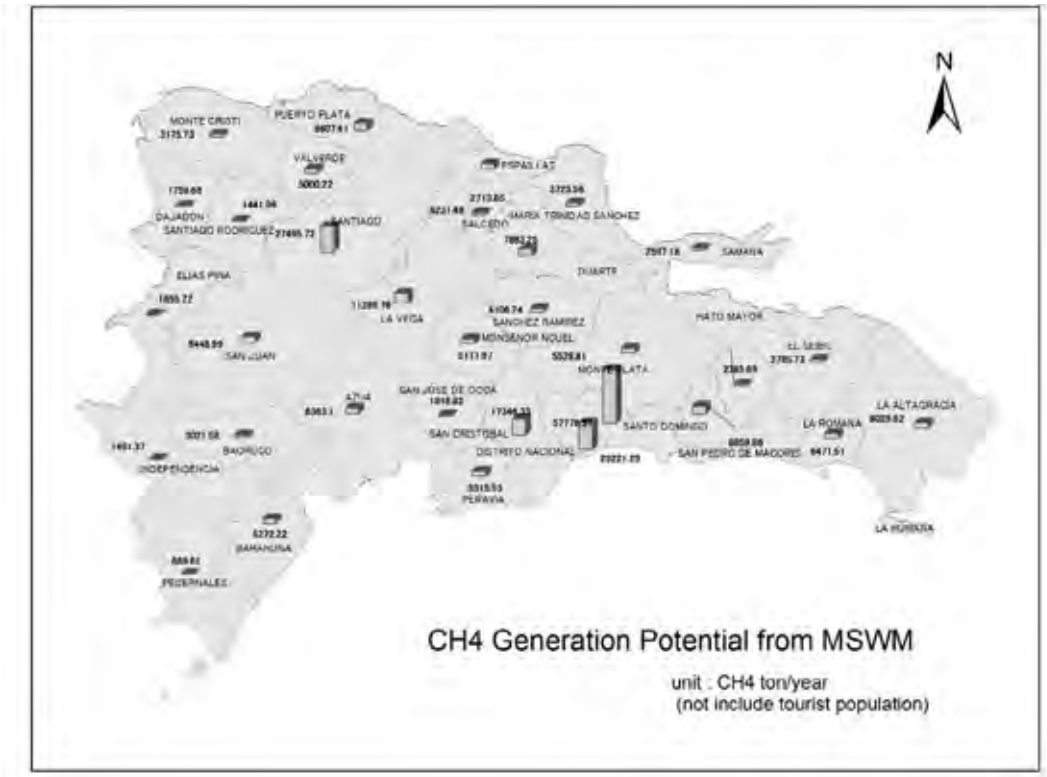

Figure 3-11: Potential Map of CH_4 Generation from Solid Waste

The potential of methane emission reduction depends upon the amount of organic waste currently treated in anaerobic condition. The figure above indicated that significant potentials of methane reduction exist in the big cities with a large number of populations such as the National District, Santo Domingo, Santiago, and so forth. However, further investigation is required for estimating the exact potential of methane emission reduction based on the identification of detailed composition of waste and current waste management and disposal practices.

b.2. Selection of the CDM projects

As to the landfill methane capture projects, due to comparatively high cost of initial investment required for civil works and facilities, it can only be applied to the big cities as previously mentioned.

On the other hand, organic waste composting project can be applied at various scales if utilizing programmatic CDM scheme. The following figures show conceptual design of composting projects at small (less than 10 tons/day), medium (less than 100 tons/day) and large scale (over 100 tons/day) that can be discriminatively applied depending upon the amount of organic waste treated.

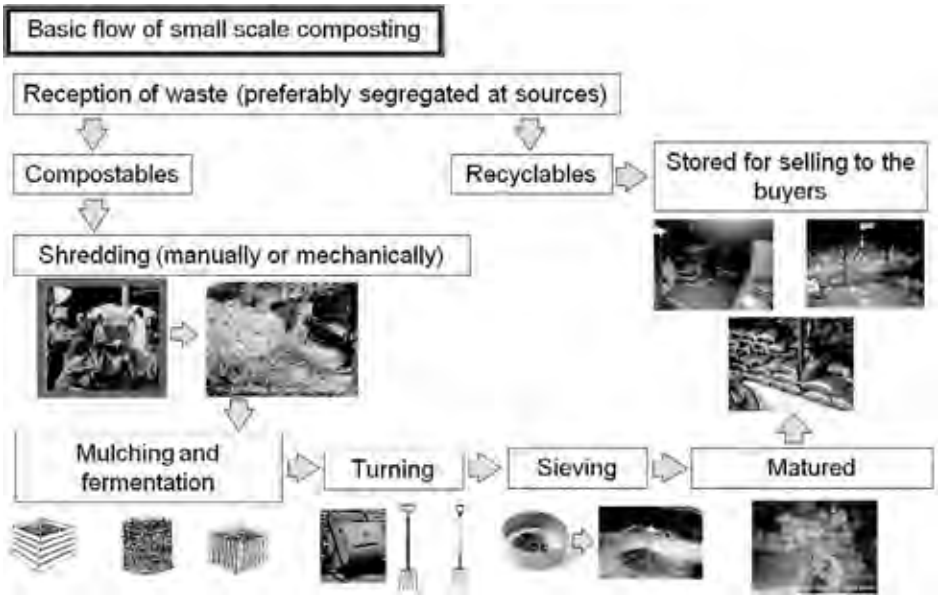

Figure 3-12: Conceptual Design of Small-Scale Composting

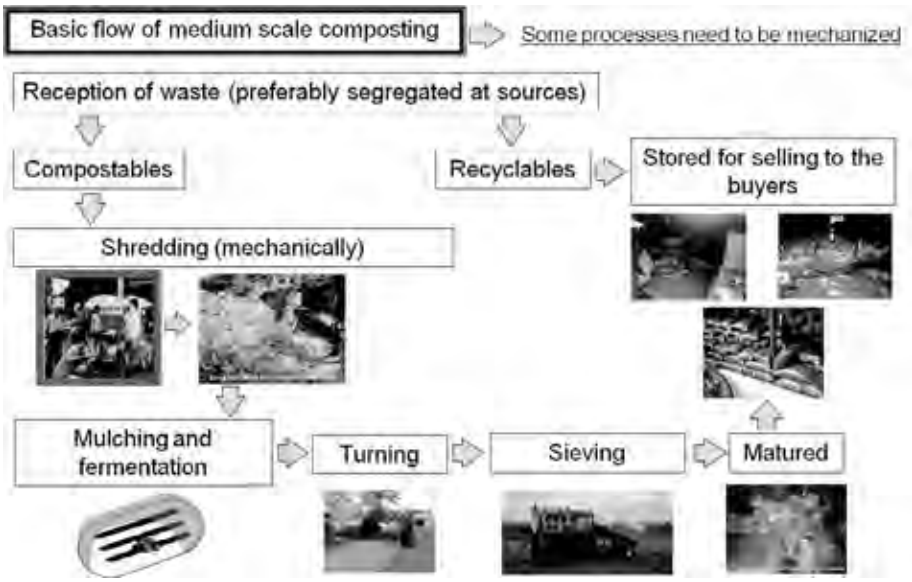

Figure 3-13: Conceptual Design of Medium-Scale Composting

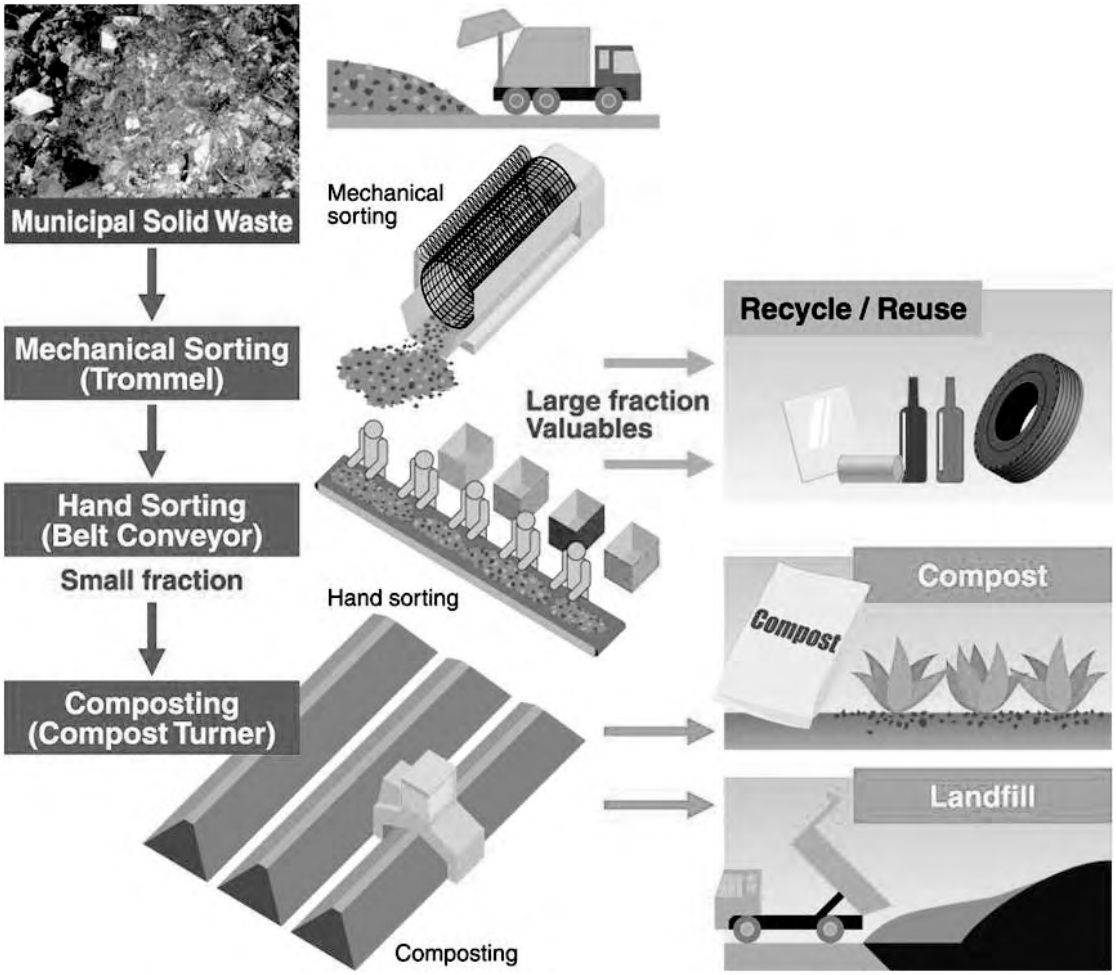

Figure 3-14: Conceptual Design of Large-Scale Composting

Based on the amount and types of waste handled as well as the current practice of solid waste disposal, the most suitable CDM projects should be identified in cooperation with the waste management authorities.

c. Strategy for development of methane capture project in waste water management

The potential of methane capture also exists in treatment of waste water with high organic content. Domestic as well as industrial waste water can be the subject of GHGs emission reduction by applying the methane capture methodology if the water has a high organic content.

In the case of industrial effluent, the factories that discharge high organic content of waste water can be identified based on the type of products they manufactured. In the case of the Dominican Republic, such industries include food/beverage industries and agricultural/livestock product processing. To more specifically identify the potentials of methane emission reduction in these factories, the following data and information need to be collected as previously mentioned:

- Wastewater discharge amount and flow rate;
- Quality of wastewater (BOD, COD, TOC, etc.); and

- Current wastewater treatment practice.

Based on the population data, the Study estimated the discharge amount of domestic waste water and their potential methane emission as shown in the map below to assess the potentials of CDM project. That will provide a basic potential data of methane capture from domestic waste water at province level.

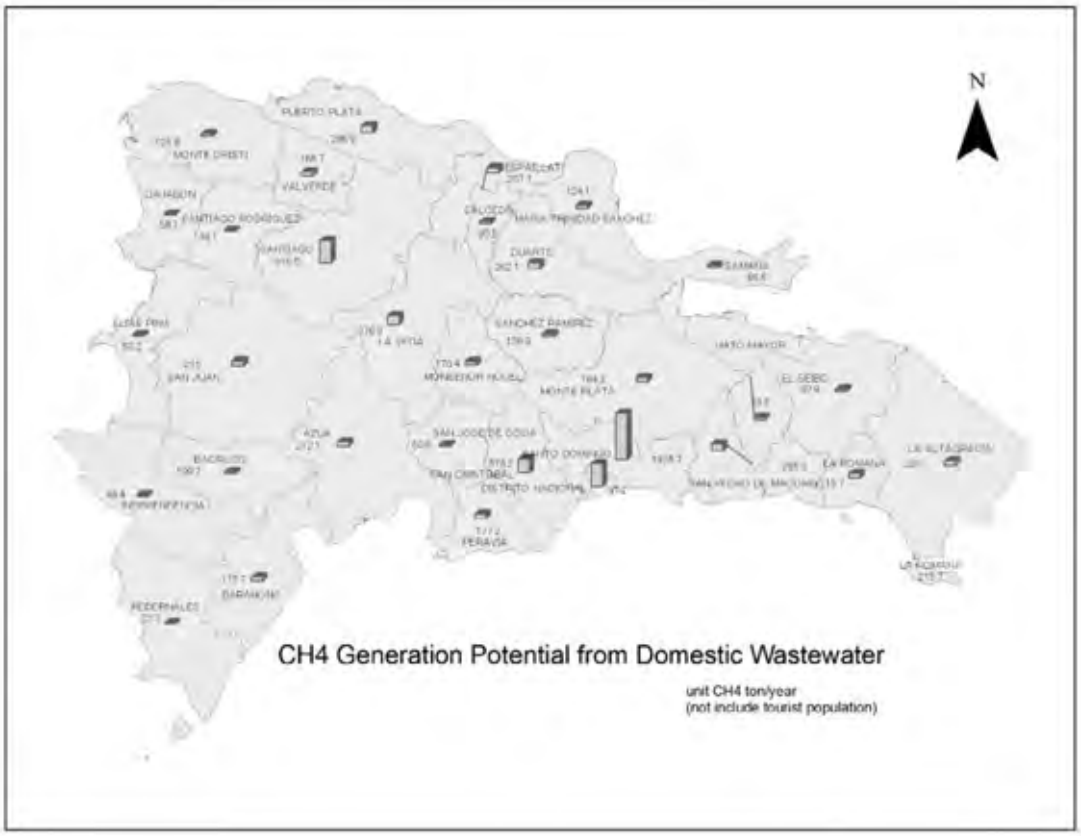

Figure 3-15: Potential Methane Generation from Domestic Waste Water

Depending upon the amount and condition of waste water, the methane capture projects as shown in the following figures can be developed for domestic as well as industrial effluent. These prototypes of CDM projects in relation to waste water treatment have to be promoted to the relevant industries and waste water treatment authorities.

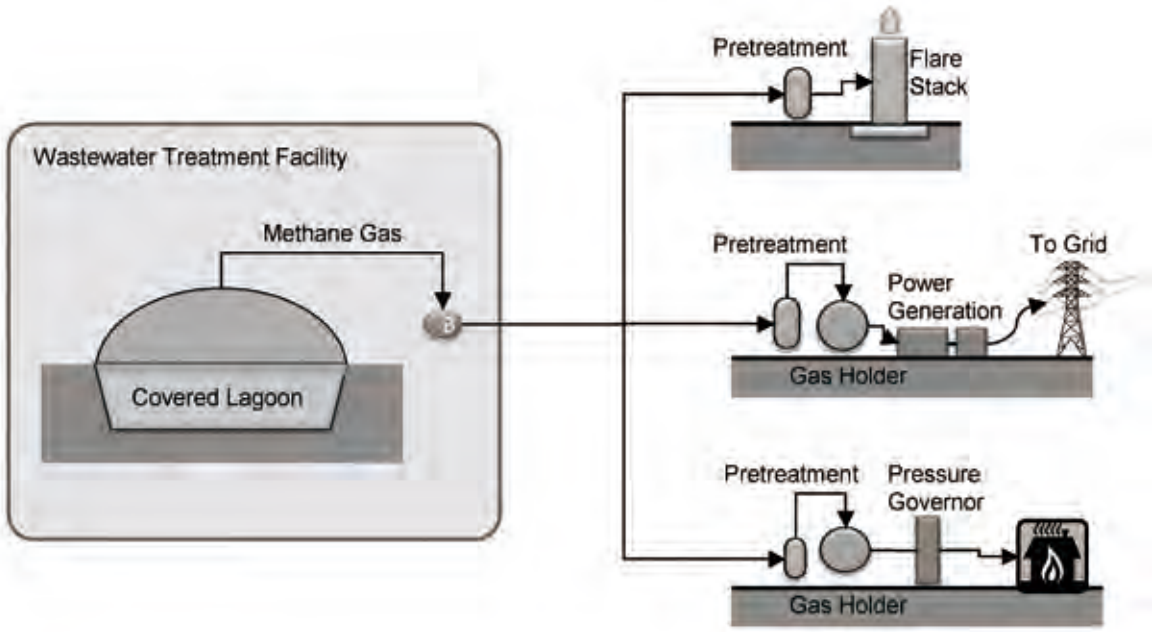

Figure 3-16: Methane Capture and Utilization by Covered Lagoon

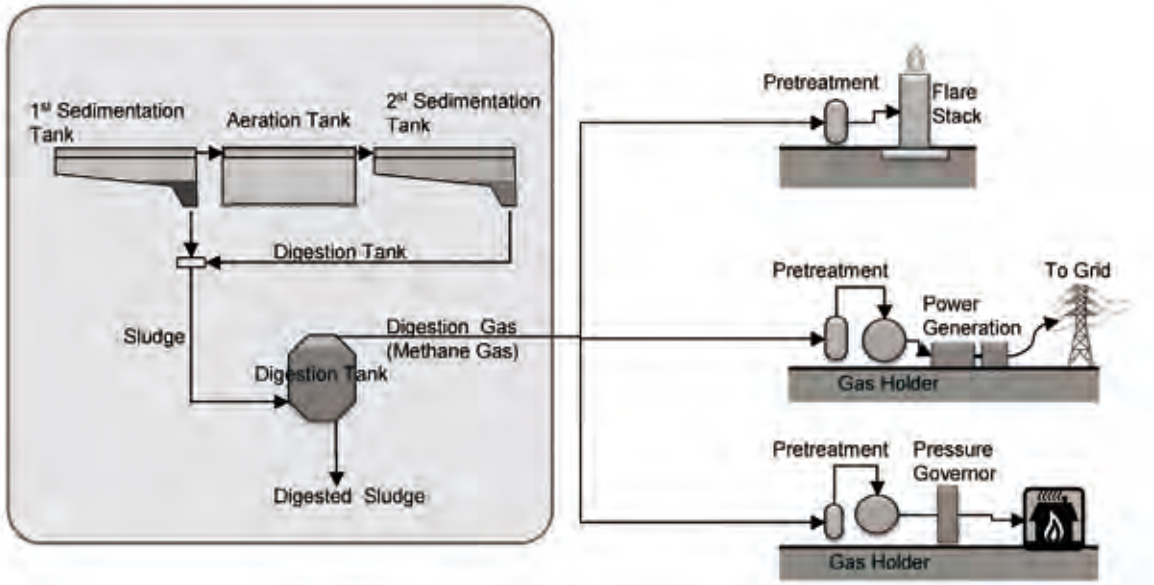

Figure 3-17: Methane Capture and Utilization by Digesters (Digestion Tanks)

3.5 The Dominican Republic Action Plan on CDM Project Development

3.5.1 Targets of CDM Project Development and Short-Term Actions

Based on the determination of priority sectors of CDM project development and strategies mentioned in the previous sections, the Study sets the targets of CDM project development by the end of 2012, the 1st commitment period of Kyoto Protocol as shown in the table below.

Table 3-16: Targets of CDM Project Development in the Dominican Republic

Priority Areas	CDM Project Development Targets by 2012
1. Energy Sector (Supply Side)	
Wind Power	▪ To register wind power CDM projects in the potential areas (Target Areas) - Monte Cristi - Puerto Plata - Barahona - Pedernales
Hydropower	▪ To register hydropower CDM projects in the potential areas identified by EGEHID ▪ To register hydropower CDM projects in the potential areas identified by INDRHI ▪ To formulate at least one programmatic CDM of mini-hydropower projects in cooperation with the relevant stakeholders
Biomass	▪ To register CDM projects of biomass power generation in the potential areas (Target Area) - Eastern part of the country (sugarcane bagasse) - Northern part of the country (rice husk) ▪ To register CDM projects of biomass energy utilization by industrial enterprises (for boiler fuels) in cooperation with the relevant stakeholders
2. Energy Sector (Demand Side)	
Industry	▪ Clear Identification of current fuel and energy consumption in industry sector. ▪ To register CDM projects of fuel switch or energy efficiency improvement in industry sector in cooperation with private industrial enterprises.
Transport	▪ To investigate the potentials of fuel switch and energy efficiency in transport sector through discussions with public transport and freight companies for collective application of GHGs emission reduction technologies and/or measures.
Residential/Business/ Commercial	▪ To develop programmatic CDM projects of energy efficient lighting in cooperation with the relevant stakeholders.
3. Industrial Process GHGs Emission (Non-Energy)	
Relevant Industries	▪ Facilitate development of CDM projects through direct discussions with the relevant industrial enterprises. - Cement industry

Priority Areas	CDM Project Development Targets by 2012
	- Iron & steel industry
4. Methane Emission Reduction	
Pig Farms	▪ To develop and register CDM projects of methane capture and utilization from animal manure management based on discussions with relevant stakeholders. (Target Stakeholders) - APORLI - COOPCIBAO
Solid Waste Management	▪ To develop and register CDM projects of landfill methane capture and utilization with its focus on the landfills in the big cities. ▪ To develop and register CDM projects of organic waste composting in cooperation with solid waste management authorities.
Waste Water Management	▪ To develop and register CDM projects of methane capture from waste water treatment (Target Stakeholders) - Industrial enterprises with a large amount of organic waste water discharge (food and beverage, palm oil, alcoholic products)

The short-term actions to be taken for CDM project development in each priority area above are recommended as follows:

Table 3-17: Short-Term Actions for CDM Project Development by Priority Areas

Priority Areas	Short-Term Action to be Taken
1. Energy Sector (Supply Side)	
Wind Power	▪ Discussions with potential wind power developers. ▪ Investigation of potential sites ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation by project proponents.
Hydropower	▪ Discussions with EGEHID and INDRHI about potential sites of hydropower generation CDM projects. ▪ Coordination with relevant stakeholders - SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
Biomass	**(Biomass Power Generation)** ▪ Discussions with potential developers of biomass power generation (private developers) ▪ Coordination with relevant stakeholders

Priority Areas	Short-Term Action to be Taken
	- SENI (Technical issues related to grid connection) - CNE (Utilization of the incentives under Law 57-07) - CDEEE/EDE (Power purchasing agreement) - Ministry of Agriculture (Procurement of biomass) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation. **(Biomass Energy Utilization)** ▪ Discussions with potential users of biomass as fuel for industrial heat production. (industries) ▪ Coordination with relevant stakeholders - CNE (Utilization of the incentives under Law 57-07) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
2. Energy Sector (Demand Side)	
Industry	▪ Discussions with potential project proponents ▪ Coordination with relevant stakeholders - CNE (Use of any incentives related to fuel switch and/or energy efficiency improvement) - MIMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
Transport	▪ Discussions with public transport and freight companies
Residential/Business/ Commercial	▪ Discussions with potential stakeholders (hotels, office buildings, resident communities, and other potential group of participants)
3. Industrial Process GHGs Emission (Non-Energy)	
Relevant Industries	▪ Discussions with potential project proponents (cement, rum, iron & steel industries) ▪ Coordination with relevant stakeholders - MIMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation.
4. Methane Emission Reduction	
Pig Farms	▪ Discussion with associations of pig farmers (APORLI, COOPCIBAO, etc.) ▪ Selection of participating farmers ▪ Determination of CME ▪ Preparation of PoA and CPA-DD and validation
Solid Waste Management	(Landfill methane capture) ▪ Discussions with the relevant solid waste management authorities (Santiago) (Organic waste composting) ▪ Discussions with the relevant solid waste management authorities (Dominican Municipal Leagues, Dominican Federation of Municipalities) ▪ Selection of participating municipalities ▪ Preparation of PDD (single or programmatic CDM) and validation.
Waste Water Management	▪ Discussions with potential project proponents (Industrial enterprises with a large amount of organic waste water discharge such as food

Priority Areas	Short-Term Action to be Taken
	and beverage, palm oil, alcoholic products) ▪ Coordination with relevant stakeholders - CNE (Utilization of the incentives under Law 57-07) - SEMARENA (Environmental Impact Assessment) ▪ Preparation of PDD and validation

3.5.2 Recommendations Regarding the Strengthened Roles of ONMDL in CDM Project Development

The ONMDL should focus on strengthening its capacity in the following roles and functions in relation to CDM project development:

- Functions as DNA (Assessment and Evaluation of CDM Projects for National Approval)
- IEC (Information, Education and Communication) on CDM
- Inter-Sectoral (Inter-Ministerial/Governmental as well as Public-Private Sector) Coordination for CDM Project Development

The ONMDL must take the initiative in strengthening these capacities with clear definitions of its roles with enough human resources. This section discusses the details of capacity development for each of the above functions.

a. Function as DNA

The most important role of ONMDL as DNA is to assess and evaluate the CDM projects proposed in the form of PINs and PDDs for issuance of national approvals.

ONMDL has already developed the necessary institutional mechanism for national approval of CDM projects including:

- Official procedure for host country approval of CDM projects;
- National sustainability criteria for CDM projects;
- Evaluation criteria and form for national approval of CDM projects; and
- Organization of CDM project evaluation/approval team

All of the above information and materials are available in the National CDM website of CNCCMDL (http://www.cambioclimatico.gob.do/).

b. Function as the Provider of IEC (Information, Education and Communication) on CDM

In promoting CDM projects in the country, the function of IEC (information, education, and communication) is of great importance. ONMDL should also be the national platform for IEC on CDM in addition to the function as DNA.

b.1. Function as the National Information Platform of CDM

As the national information platform of CDM, ONMDL is required to collect and keep the latest information and data of CDM so that anyone can always access to necessary information for development of CDM projects. Such function has been developed by the Study through establishment of "The Dominican Republic CDM Website" (which is available at http://www.cambioclimatico.gob.do/). This website will provide regularly updated information and data through regular observation of the world trend over CDM. The site will also provide the basic toolkit for key documentation required for registration of the project under CDM.

ONMDL must have one person in charge of managing and updating the contents of this website in order to keep the users updated of the information on CDM.

In addition to the use of website above, ONMDL is also recommended to conduct public relation activities of CDM in the country through publication of PR materials (pamphlets, guidebook, etc.), media exposure (TV, Radio, newspapers), participation in the relevant events for CDM promotion, and so forth.

b.2. Function as the National Education Platform of CDM

ONMDL is also required to be the center of education and training on CDM in the Dominican Republic. The main role of ONMDL as the national education platform of CDM includes holding the seminars and workshops and cooperation with academic society to strengthen the capacity of relevant stakeholders in CDM project development. The purposes of such education include:

- Disseminating the concept of CDM through the seminars targeting general public (non-expert of CDM);
- Strengthening the capacity of CDM project formulation through the seminars and training workshops, targeting the potential CDM project planners and proponents, e.g. central and local government organizations, private companies, and NGOs relevant to the key sectors of CDM project development; and

- Strengthening the capacity of CDM project document preparation through technical seminars and workshops, targeting local engineers, consultants, universities, and entrepreneurs.

To carry out this function, ONMDL must have resource persons, internally or by outsourcing, having enough knowledge and experience in CDM as the lecturers of the seminars and workshops.

b.3. Function as the National Communication Platform of CDM

The function as the national communication platform of CDM denotes that ONMDL will represent the Dominican Republic in the world of CDM within and outside the country. This function has to be carried out by the Executive Vice President of CNCCMDL and deputized by the Director of ONMDL. The main roles as the national communication platform of CDM include:

- Promoting CDM in every opportunity of the national and international events (national as well as international conventions, seminars, meetings, etc.) programmes, and any other public relations activities with its focus especially on encouraging investment and participation in CDM project development; and
- Working as the national focal point of CDM project development through building linkages of all relevant stakeholders including public and private sectors (government, business, academy, community, people) domestically as well as internationally.

c. Strengthening of Inter-Sectoral Coordination for CDM Project Development

Inter-sectoral coordination is the important key of practically promoting CDM project development in the country. The main purpose of inter-sectoral coordination is to mobilize at its maximum the capacity of all relevant stakeholders for promoting CDM. Practical actions to be taken for inter-sectoral coordination are described below.

c.1. Coordination for Minimizing the Bureaucratic Process for CDM Project Development

Not limited to CDM project development, all types of development activities are required to go through a series of bureaucratic processes for obtaining their permits by the government. Different types of development activities have different procedures for their government permission. Since the CDM project development process requires additional bureaucratic process to the conventional project development procedures, proper coordination is indispensable to speed up and minimize this bureaucracy.

The ultimate goal of this coordination is that ONMDL becomes the one stop window for obtaining CDM project development procedure. ONMDL is required to discuss with the relevant government organizations to properly coordinate the development permits acquisition procedures so that the potential CDM project proponents can smoothly clear the necessary procedures.

c.2. Inter-Sectoral Policy/Programme Coordination for CDM Project Development

Inter-sectoral policy and programme coordination is another important action to be taken by ONMDL as the national coordinator of CDM project development in the country. The purpose of this coordination is to solve potential conflict between the sectoral policies/programmes and CDM project development such as the conflict of land use between sectoral developments, as well as to incorporate the CDM project development into the sectoral policies and programmes of the government. This coordination is the key to mobilization of available political, technical and financial resources for CDM project development to their largest extent possible.

c.3. Areas of Coordinated Actions Required by Sector for CDM Project Development

Based on the recognition in the previous sections above, the courses of coordinate actions required by ONMDL for CDM project development are described by each sector in the table below.

Table 3-18 Coordinated Actions Required by Key Sectors for CDM Project Development

Sector	Areas of Coordinated Actions Required	Key Sector Organizations
Common in all sectors	▪ Environmental impact assessment procedure	SEMARENA
	▪ Land use permits	Land use/tenure authorities
	▪ Development/Facility construction/operation permits	Relevant sector organizations
Renewable Energy	▪ Energy policy/programme	CNE
	▪ Electricity generation/supply policy/programme	SENI, EDE, CDEEE
	▪ Renewable energy development policy/programme (in relation to Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes)	SENI, EDE, CDEEE
	▪ Power Purchasing Agreement	EDE
	▪ Procurement of agricultural biomass for energy use	Ministry of Agriculture
	▪ Procurement of other biomass for energy use	SEMARENA
	▪ Rural electrification	Ministry of Public Health and Social Affairs
	▪ Wind power development (depending upon the locations)	Ministry of Tourism SEMARENA

Sector	Areas of Coordinated Actions Required	Key Sector Organizations
	▪ Hydropower development	SEMARENA, Ministry of Agriculture, EDEHID, etc.
Waste Management	▪ Landfill operation with methane capture and utilization	SEMRENA, League of municipalities, EDE
	▪ Promotion of composting	League/Federation of municipalities, Ministry of Agriculture, Ministry of Public Health and Social Affairs
Waste water management	▪ Waste water management with methane capture and utilization (household waste water)	League of municipalities, Ministry of Public Works
	▪ Waste water management with methane capture and utilization (Agricultural effluent)	Ministry of Agriculture
	▪ Waste water management with methane capture and utilization (Industrial effluent)	Ministry of Industry and Commerce
Industry	▪ Fuel switch (to non-biomass less carbon fuels)	CNE, CDEEE, EDE Ministry of Industry and Commerce
	▪ Fuel switch (to biomass fuels)	CNE, CDEEE, EDE Ministry of Industry and Commerce, Ministry of Agriculture, SEMARENA
	▪ Energy Efficiency Improvement	Ministry of Industry and Commerce
Transport	▪ Fuel switch and energy efficiency improvement	Ministry of Industry and Commerce, CNE, SEMARENA, public transport authorities
	▪ Mass transit system	Public transport authorities
Afforestation/ Reforestation	▪ Forest management and utilization policy/programme	SEMARENA Ministry of Agriculture Agro-forestry organizations

3.5.3 Recommendation Regarding the Organization Structure of ONMDL with its roles and required human resources

Considering its required roles and capacities discussed in the previous sections, the Study recommends the organizations structure of ONMDL with their roles and human resources as follows.

a. Organization Structure of ONMDL

Currently, ONMDL consists of the Director and 2 CDM experts with a secretary, as shown in the table below.

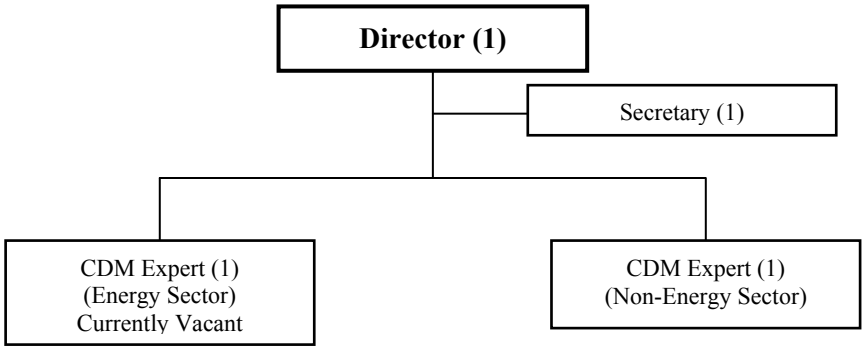

Figure 3-18 Current Organization Structure of ONMDL

Obviously, the current human resources available are not enough to fully carry out the roles and functions required for ONMDL mentioned above.

The Study recommends the organization structure of ONMDL as shown in the table below.

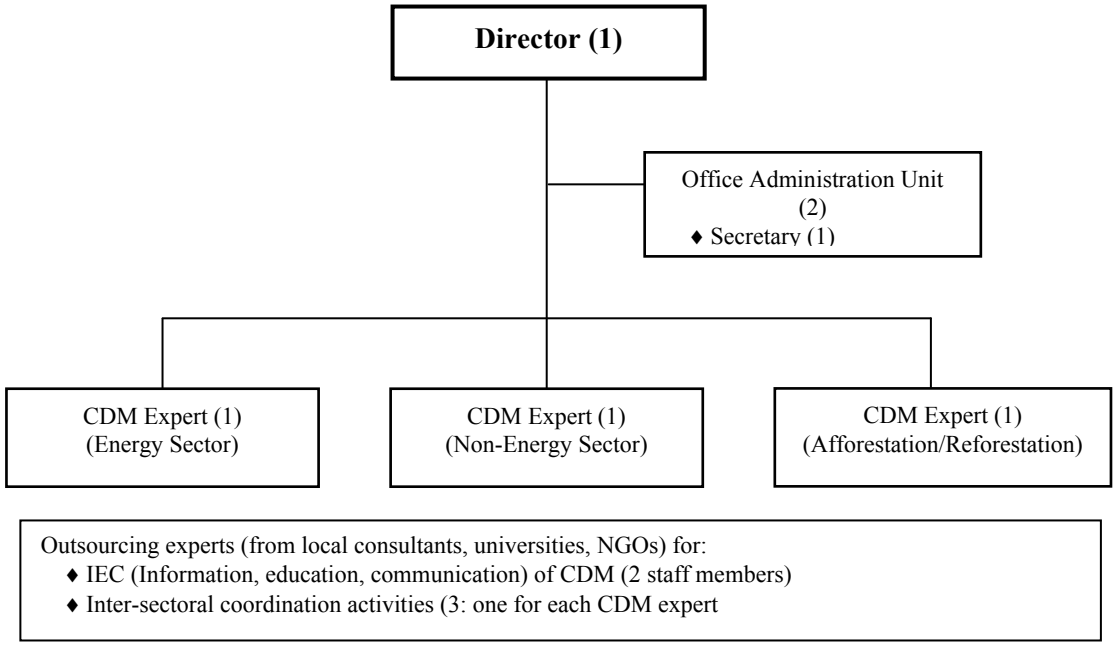

Figure 3-19 Recommended Organization Structure of ONMDL

At least, the total of 6 permanent members is required for fully and smoothly carrying out the tasks identified above. For IEC and inter-sectoral coordination activities of CDM, necessary experts can be outsourced from local consultants, universities, and NGOs, depending upon the programmes formulated by ONMDL.

b. Specific Tasks of the Members of ONMDL

In accordance with the organization structure shown above, the specific tasks of the members of ONMDL are recommended in the table below.

Table 3-19 Specific Tasks of the Members of ONMDL

Members	Tasks
Director	▪ To deputize the executive vice president of CNCCMDL on CDM matters. ▪ To manage and supervise overall activities of ONMDL
Secretary	▪ To control the schedule of the Director of ONMDL ▪ To manage all the administration of ONMDL
PR Officer	▪ To manage and control all PR activities of ONMDL ▪ To maintain and update the National CDM Website ▪ To plan and implement seminars and workshops on CDM
CDM Experts	▪ To provide expert input to IEC activities of ONMDL. ▪ To plan and conduct inter-sectoral coordination activities for CDM project development. ▪ To function as the window for CDM project proponents. ▪ To plan outsourcing of CDM experts

4 Conclusions and Recommendations

4.1 Conclusions

4.1.1 Status of CDM Project Development before and after the Study

At the time of starting the Study in 2008, there is only one registered CDM project on wind power, which was not implemented due to project owners' management issues, in the Dominican Republic. The CDM projects in the pipelines recognized by the DNA of the Dominican Republic remains at 15, of which the majority is still at the PIN or conceptual planning level. The only CDM project that was active in the process of validation was "Duequesa Landfill Methane Capture Project".

However, the collaborative efforts of CDM project promotion between the CNCCMDL and JICA Study Team, in cooperation with various public and private stakeholders for the past 3 years, the number of CDM projects in the pipelines reached more than 40 projects with 11 projects currently under validation. The Duquesa Landfill Methane Capture Project mentioned above has already been officially registered under CDM and started its operation to apply for the first issuance of CERs.

The interest and motivation of the Dominican Republic people on CDM has certainly grown with the increased knowledge and capacity of CDM project among public and private stakeholders. It is fait to say that the various promotion and capacity development activities on CDM carried out by CNCCMDL and the JICA Study Team somehow contribute to this progress of CDM project development in this country.

4.1.2 Barriers against CDM Project Development and Approach/Achievement of the Study

There were various barriers that hampered CDM project development in this country. Some of them have been removed or dramatically improved while the others still remain. The barriers that the Study identified and tried to remove include:

Lack of Information

The essential information required for CDM project formulation and development was not readily available anywhere in the Dominican Republic. Defining the ONMDL of CNCCMDL as the information platform of CDM, the Study collected and compiled all the essential information and data required for CDM project formulation and disclosed them to the public through creation of "The Dominican Republic National CDM Website". The results and output of the Study are also uploaded for the use by potential CDM project stakeholders. The contents of this website was periodically reviewed and updated all through the Study period so

that the users can always access the latest information on CDM. One of the CDM project developers visiting ONMDL from Mexico admired this website as one of the best CDM websites in the Caribbean countries.

Lack of Capacity

Lack of the capacity in CDM project development was serious among public as well as private stakeholders. The Study had to start with explaining the very essence of CDM in the seminars and workshops in its early period. To widely understand the benefits of CDM to the country, CNCCMDL and the JICA Study Team took every opportunity of public relations activities to disseminate CDM such as the meetings with private stakeholders, posting articles in the local media, and so forth. In October 2010, the CNCCMDL finally hosted the Latin American Carbon Forum in Santo Domingo successfully with a number of participation from domestic as well as overseas.

In the early stage of the Study, most of the public and private stakeholders of CDM in this country are the audience of the seminar or those who learned from the workshops. However, in the final seminar, they are the presenters to share their knowledge and experience with the other audience. One of the study counterpart members are surprised that the questions raised by the audience in the seminar became technical and specific, totally different from the questions raised in the early seminars and workshops. The capacity and knowledge of CDM has certainly grown among the public and private stakeholders.

Lack of Communication

At the time of starting the Study, mainly due to limited human resources, ONMDL's role is basically limited to assess the submitted PINs and PDDs for issuance of no objection letter for PIN or host country approval for PDD although some communications with the potential CDM project stakeholders are conducted individually by the staff members. In the course of the Study, however, the ONMDL counterpart members and the study members were working together to have meetings and discussions with various public and stakeholders while sometimes visiting the farms, factories or potential project sites with the stakeholders to facilitate CDM project development. Some of the PINs and model PDDs were formulated through a series of these communications. A considerable number of same members repeatedly participated in the seminars and workshops held by CNCCMDL and/or the Study Team from public as well as private stakeholders. The final seminar of the Study was in fact led by these members as presenters or audience. In this respect, the DNA's communication with the relevant public and private stakeholders is truly strengthened to facilitate CDM projects in this country.

Lack of Motivation

Mainly Due to the limited knowledge and understanding, the interest of the public and private stakeholders for CDM was not high with some exceptions. However, with its enhanced knowledge and understanding, their interest for CDM has increased with the number of PINs and PDDs submitted to ONMDL. Because of the limited experience in actual operation of CDM projects in this country, many of them may be still skeptical about CDM. In this respect, there was a symbolic event in the course of the Study. Inviting several public and private CDM stakeholders, the Study conducted a study tour to the neighboring countries (Peru, Mexico, and Costa Rica) to understand the CDM project development in these countries. The tour included the visits to DNA of each country and CDM project sites with the discussions with project owners and operators. After this tour, many of the participants mentioned with one accord that it was totally different between learning the CDM from written information and directly observing the project in operation with hearings from the project owners/operators. Their motivations after this tour have been changed. Some of them have submitted their new PINs soon after this tour as the project proponents and tried to develop their own CDM projects.

This is a good example of how to motivate the potential project proponents. If the Dominican Republic has several forerunners of CDM projects, their experience will encourage the other stakeholders to formulate CDM projects.

4.2 Recommendations

This development study, under the JICA's technical cooperation programme, will end with submission of the Final Report to the Government of the Dominican Republic on December 2010. The Study formulated the "Dominican Republic National Action Plan for CDM Project Development", while it produced various technical tools for promoting CDM project development for the use by potential project proponents in public as well as private sectors.

To efficiently utilize these results of the Study for accelerated realization of CDM projects in the Dominican Republic, the Study Team made the following recommendations.

4.2.1 Remaining Tasks to be accomplished by the Government of the Dominican Republic

4.2.2 The Tasks of CNCCMDL and ONMDL

The National Council for Climate Change and Clean Development Mechanism (CNCCMDL), as the national focal point, must take the initiative in promotion of CDM project development in the Dominican Republic. In addition to the roles of issuing host country approval of individual CDM projects as DNA, the National Office of CDM (ONMDL) has to play its active roles in

CDM project promotion and marketing, technical and financial assistance to the potential CDM project developers, owners and participants. As the results of the Study, ONMDL/CNCCMDL has the following instruments/tools to support CDM project developers, owners, and participants:

- PINs and model PDDs of prospective CDM projects;
- CDM project formulation manual;
- GIS-based potential map of CDM projects;
- National CDM portfolio
- National CDM website

These tools are all developed for assisting CDM project proponents in terms of project documentation as well as promotion and marketing of potential projects to potential investors, developers and financial institutes. ONMDL/CNCCMDL has to utilize them at their maximum for CDM project development in this country.

On the other hand, without continuous update and improvement of their contents, all the above tools will soon be obsolete in the constantly changing world of CDM and climate change issues.

Therefore, the Study Team strongly recommends that ONMDL/CNCCMDL will continuously update and improve the contents of these tools by incorporating new data and information. ONMDL/CNCCMDL should appoint at least one person in charge of this task so that the contents of the tools can be timely updated and improved. The update and improvement of these tools will be carried out in accordance with the guidelines provided by the JICA Study Team.

The remaining important task to be further strengthened at government level is financial assistance to CDM project proponents. The currently planned “National Carbon Fund” is expected to take this role in accordance with the presidential decree on establishment of CNCCMDL. The key roles of National Carbon Fund are as follows:

- Providing carbon finance or loan guarantee to CDM projects;
- Brokerage and intermediation of carbon credit purchasing agreement/contract between CDM project owners and carbon buyers;
- Taking the roles of CME (Coordinating Management Entity) of programmatic CDM projects as well as the bundling center of small-scale CDM projects to make smooth transaction of small carbon credit with potential buyers; and

- Promotion of the country's CDM potential to foreign CDM developers, investors, financial institutes, donors and consultants to facilitate project development.

The basic structure of National Carbon Fund is illustrated in the figure below.

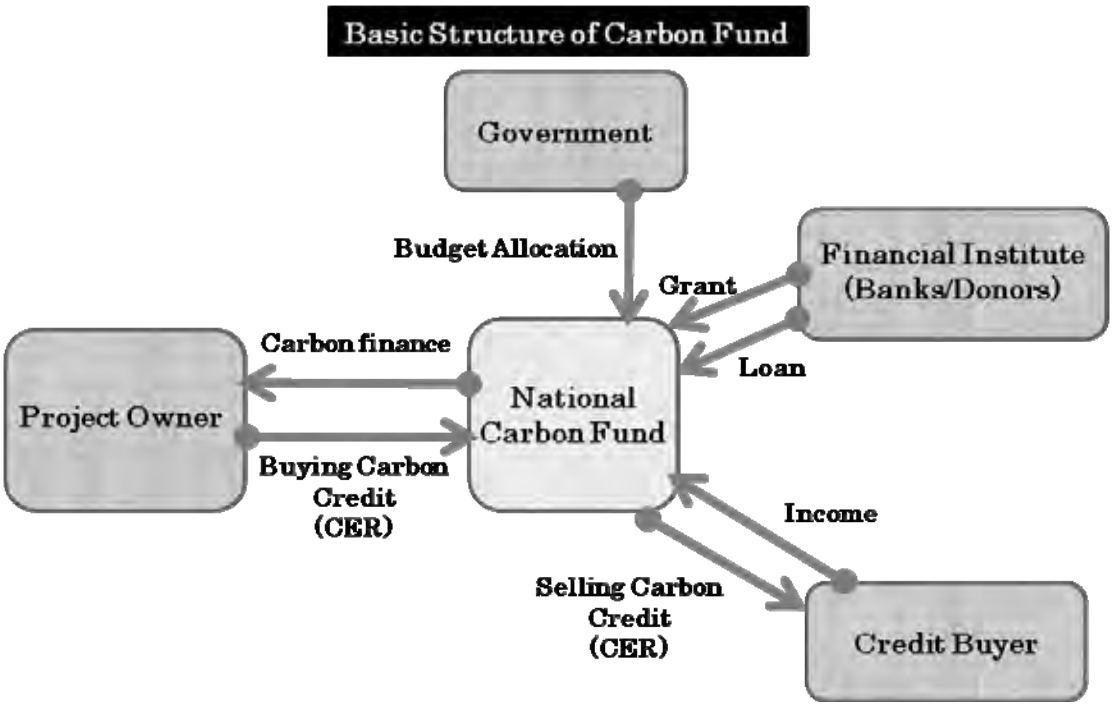

Figure 4-1: Basic Structure of National Carbon Fund

The initial fund required for establishment of National Carbon Fund should be determined on the basis of estimation of carbon credit produced from the CDM projects listed in the National CDM Portfolio. This portfolio is the only trading articles for raising the initial fund for CDM project development in this country.

The fund raising efforts should be made by CNCCMDL domestically and internationally through the following actions.

- Coordination with other governmental development funds (Environmental fund and renewable energy fund, etc.)
- Carbon credit purchasing agreement with ANNEX I countries.
- Negotiation with bilateral/multilateral carbon funds, e.g. Prototype Carbon Fund (PCF) of the World Bank, Andean Development Corporation (CAF), and so forth.
- Involvement of domestic banks/financial institutes in carbon financing.

4.2.3 Tasks of Other Key Public Stakeholders by Sectors of CDM Project Development

Other key public stakeholders and their recommended tasks in CDM project development are specified by sectors in the table below.

Table 4-1: Key Public Stakeholders and Their Roles in CDM Development by Sectors

Sector	Key Public Stakeholders	Roles
Common in sectors	Ministry of Treasury	▪ Government budget allocation to the National Carbon Fund
	Ministry of Environment and Natural Resources (MIMARENA)	▪ Environmental impact assessment/ evaluation of CDM projects and issuance of environmental permits ▪ Co-financing CDM projects from the environmental fund
Energy (Supply Side)	National Energy Commission (CNE)	▪ Use of financial/tax incentives under the Law 57-07 (Renewable sources of Energy Incentives and its Special Regimes)
	Coordinating Organism of the Interconnected National Electrical System of the Dominican Republic (SENI)	▪ Technical coordination for connection to national grid electricity
	Dominican Corporation of State Electric Companies (CDEEE) Electrical Distribution Companies (EDE)	▪ Power purchasing agreement/ contract under the Law 57-07
	Dominican Hydropower Generation Company (EGEHID) National Institute of Hydraulic Resources (INDRHI)	▪ Hydropower Plant Development and Operation
	Ministry of Agriculture	▪ Coordination with farmers for procurement of biomass
	Ministry of Industry and Commerce	▪ Coordination with industrial enterprises as the user of biomass fuels
Energy (Demand Side)	National Energy Commission (CNE)	▪ Coordination with the national policy related to energy saving
	Ministry of Industry and Commerce	▪ Identification of priority industry sub-sectors of fuel switch and energy saving ▪ Coordination with relevant industry associations and groups ▪ Coordination with commercial establishments for investigation on the possibility of collective application of GHGs emission reduction measures
	Ministry of Transport	▪ Coordination with public transport authorities for investigation on GHGs emission reduction potentials.

Sector	Key Public Stakeholders	Roles
	Ministry of Tourism	▪ Coordination with tourism industry (hotels) for investigation on the possibility of collective application of GHGs emission reduction measures
Industrial Process	Ministry of Industry and Commerce	▪ Coordination with relevant industries for further investigation of applying GHG emission reduction measures as CDM.
Agriculture (Livestock)	Ministry of Agriculture	▪ Coordination with associations of livestock farmers for organizing programmatic CDM projects.
	National Energy Commission (CNE)	▪ Use of financial/tax incentives under the Law 57-07 (Renewable sources of Energy Incentives and its Special Regimes)
Solid Waste Management	Municipal Government Dominican Federation of Municipalities	▪ Identification of potential participating cities for CDM projects. ▪ Coordination with the relevant local authorities for organizing programmatic CDM.
Wastewater Management	Ministry of Industry and Commerce	▪ Identification of potential industries for conducting methane related CDM projects. ▪ Coordination with relevant industrial associations and groups for investigation on the potentials of GHGs emission reduction.

4.2.4 Implementation of the National Action Plan

"The Dominican Republic National Action Plan for CDM Project Development" identifies the potentials and priority sectors of CDM project development in the country with strategies and actions to be taken by the relevant public and private sectors. Taking into account the limited time up until the end of the 1st commitment period of Kyoto Protocol on December 2012, this National Action Plan must be implemented immediately so that the country's opportunities of CDM project development can be maximized. To ensure implementation of the National Action Plan, the JICA Study Team recommended the following actions to be taken immediately by ONMDL/CNCCMDL.

a. Promotion of CDM project development in renewable energy sector

Among the priority sectors of CDM project development identified in the National Action Plan, CDM projects in renewable energy sector (especially for wind, hydropower and biomass) are currently on the fast track in terms of identified potential project locations, project developers and preparation of project documentation. Taking into account the limited time up until 2012, the procedure for CDM project preparation has to be accelerated so that they can be registered

before the 1st commitment period comes. In this respect, the JICA Study Team strongly recommends that ONMDL/CNCCMDL should organize the special taskforce under its initiative to facilitate coordinated efforts among relevant public and private sectors in CDM project development in renewable energy sector. The special taskforce should consist of the following members:

- ONMDL/CNCCMDL
- CNE (National Energy Commission)
- SENI
- SIE (Superintendence of Electricity)
- MIMARENA
- EGE Haina (Wind)
- EGEHID (Hydropower)
- Ministry of Agriculture (Biomass)
- Other potential renewable energy developers (public/private sector)

The purpose of this special taskforce will jointly facilitate the development of CDM projects in renewable energy sector by coordinated actions for the following purposes:

- Review of on-going and planned renewable energy development projects to identify the potential CDM projects to be promoted for their registration by 2012;
- Facilitate (Speed up) the project preparation process (development permits, EIAs, and other related bureaucratic procedures);
- Providing solution to technical and administrative issues in relation to project development;

ONMDL/CNCCMDL is also strongly recommended to identify the potential CDM projects in other sectors for their promotion of registration by 2012 through reviewing the current status of progress of the projects listed in the National CDM portfolio.

b. Promotion of small-scale CDM projects through application of programmatic CDM

The Study has developed 4 types of PDDs for programmatic CDM projects, of which three PDDs address the following small scale projects respectively:

- Programmatic CDM projects of rural mini-hydropower
- Programmatic CDM projects of methane capture from animal manure management in pig farms
- Programmatic CDM projects of community organic waste composting.

Although the potential of GHGs emission reduction is rather small in amount for each individual project, they are all expected to produce various co-benefits in terms of socio-economic welfare of the people and improvement of living environment.

Taking the above into account, the JICA Study Team recommends that ONMDL/CNCCMDL should further promote these 3 (three) types of programmatic CDM projects under its initiative.

The potential project proponents of these 3 (three) projects are as follows:

Types of Programmatic CDM Project	Potential Project Proponents
Mini-hydropower	▪ INDRI (UNDP-INDRI project)
Methane capture from animal manure management in pig farms	▪ APORLI ▪ COOPCIBAO (USAID project)
Organic waste composting	▪ Provincial/City government ▪ League/Federation of Municipalities

As to the programmatic CDM projects in mini-hydropower and methane capture from pig farms, JICA Study Team recommends that ONMDL/CNCCMDL should continue further discussions with UNDP-INDRI and USAID-COOPCIBAO projects respectively. On the other hand, in organic waste composting, ONMDL/CNCCMDL should immediately start promoting the concept of programmatic CDM to provincial/city governments to investigate the possibility of formulating organic waste composting CDM projects. ONMDL/CNCCMDL may hold a dissemination workshop and/or seminar for programmatic CDM of organic composting by inviting provincial/city government representatives to start discussions.

In any case of the programmatic CDM projects above, the project proponent needs technical as well as financial assistance in the following aspects:

- Preparation of project document and validation for registration under CDM;
- Organization of CDM project participants;
- Determination of Coordinating Management Entity of the programmatic CDM project;
- Financing the initial cost of the projects.

As to the fund for initial investment of the projects, their registration as CDM will provide the opportunities of carbon finance. However, the costs arising in the process of project registration (project design, PDD preparation, validation, and coordination of project participants, establishment of CMEs) still need to be covered by the project proponents. ONMDL/CNCCMDL does not have enough capacity to meet these entire technical and financial assistance requirements. There are the needs of external technical and financial

assistance in developing programmatic CDM projects in accordance with this National Action Plan.

4.2.5 Preparation for the Post-Kyoto Framework of Climate Change

Considering the post-Kyoto framework of climate change convention in the international arena, promotion of CDM projects is not enough for non-Annex I countries including the Dominican Republic to address climate change mitigation issues in the mid and long-term. There are several new schemes of financial assistance such as NAMA (Nationally Appropriate Mitigation Action) and SCM (Sectoral Crediting Mechanism) to non-Annex I countries now under consideration. Most of these new schemes requires non-Annex I countries to formulate the national or sector level climate change mitigation plan in a verifiable and measurable manner. To effectively implement climate change mitigation measures, the Dominican Republic must prepare for formulation of such national or sector level climate change mitigation plans while promoting CDM projects. Coordinated efforts should be made by relevant public sectors to set the verifiable sectoral targets of GHGs emissions reduction with clearly defined measures and technologies. It is also required to establish the national mechanism for MRV (measurement, reporting and verification) of such actions so that the actual reduction of GHGs at national or sector level can be proved with clear evidence of information and data. The formulation of such actions and plans will increase the opportunity of carbon credit at sector or national level through the new financial assistance schemes.

Current human resources in ONMDL/CNCCMDL are very limited to handling all of these works to prepare for post-Kyoto framework of climate change. There is a need of technical assistance in formulating these national and/or sector level climate change mitigation plans and actions in the Dominican Republic. The technical assistance in the form of dispatching a climate change expert and/or provision of technical cooperation for capacity development of ONMDL/CNCCMDL in formulating national/sectoral climate change plans and actions will help the Dominican Republic in strengthening its policy drive to fight with climate change issues as well as socio-economically and environmentally sound and sustainable development.