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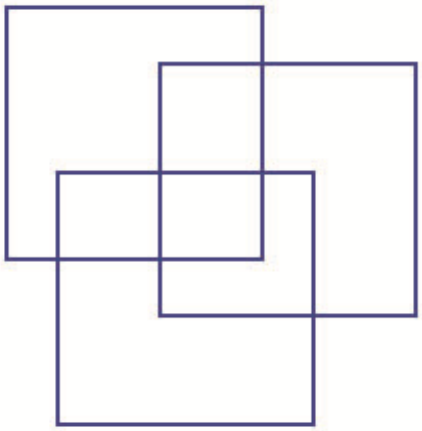
IGES

Green jobs mapping study in the Philippines

An overview based on initial desk research



Regional Office for Asia and the Pacific

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Foreword

Climate change and environmental degradation pose a severe threat to sustainable economic development in many parts of the Asia-Pacific region including the Philippines. In this regard, the government of the Philippines has committed to reducing greenhouse gases (GHG). The transition to a green economy is progressing with the implementation of various environment and climate change related policies and measures to drive more environmentally sustainable economic growth in the Philippines. This structural change towards a greener and more sustainable economic growth path, will create demand for new green technologies, green skills and green jobs and will have implications on the employment and labour market dynamics in Philippine economic sectors. It is important to ensure that any new jobs created for workers in these environment-related sectors and green sub-sectors are decent and sustainable and that existing decent work deficits are addressed.

This publication was produced under the International Labour Organization's (ILO) Green Jobs Programme for Asia and the Pacific which has created the momentum for developing new and successful partnerships to promote green jobs throughout the country. The mapping study was conducted to estimate and identify green jobs in the Philippines. It has identified potential challenges to developing a greener economy with green jobs and decent work. The report provides ILO constituents with the information and statistical data necessary to assess the economic and employment impacts of a green development strategy and provides key information on the sectors which promote environmentally-friendly decent work (green jobs). It includes policy recommendations for the Government and social partners to identify entry points for further green job creation that can drive a just transition towards a green economy.

The study is part of the ILO's wider efforts to develop the research and analytical capacities of constituents in the Asia-Pacific region in regard to green jobs and green skills. Similar green job mapping studies have also been undertaken in Bangladesh, Indonesia and Malaysia and it is envisioned that the results will lay the foundations for further economic studies on the labour market and the development of green skills programmes at the national level.

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Abbreviations

ARMM	Autonomous Region in Muslim Mindanao
AUV	auxiliary utility vehicle
BERDE	building for ecologically responsive design excellence
BPO	business process outsourcing
BRT	Bus Rapid Transit
CCRF	Code of Conduct of Responsible Fisheries
CDM	Clean Development Mechanism
CFLs	compact fluorescent lamps
CO_2	carbon dioxide
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DOE	Department of Energy
DOT	Department of Tourism
ECAN	Ecologically Critical Area Network
EDC	Export Development Council
EO	executive order
ESCO	Energy Service Company
FAO	(United Nations) Food and Agriculture Organization
FARMCs	Fisheries and Aquatic Resources Management Councils
FDIs	foreign direct investments
FiT	feed-in tariff
FMU	Forest Management Unit
GCF	gross capital formation
GDP	gross domestic product
GFII	Green Future Innovations Inc.
GHG	greenhouse gas
GIZ	Gesellschaft für Internationale Zusammenarbeit
GMOs	genetically modified organisms
GNP	gross national product

GVA	gross value added
GWh	gigawatt-hours
IEQ	indoor environmental quality
IFMAs	Integrated Forestry Management Agreements
IGES	Institute for Global Environmental Strategies
ILO	International Labour Organization
ILS	Institute of Labour Studies
IRR	implementing rules and regulations
ITTO	International Tropical Timber Organization
LCD	liquid crystal display
LEISA	low external input sustainable agriculture
LFS	labour force survey
LGUs	Local Government Units
LPG	liquefied petroleum gas
LRT	Light Rail Transit
MASIPAG	Magsasaka at Siyentipiko Para Sa Pag-unlad Ng Agrikultura (Farmer-Scientist Partnership for Development)
MDGs	Millennium Development Goals
MMBFOE	million barrels of fuel oil equivalent
MRFs	materials recovery facilities
MRT	Metro Rail Transit
$MtCO_2$	millions of tonnes of carbon dioxide
Mtoe	million tonnes of oil equivalent
MW	megawatt
MWh	megawatt-hours
NAMRIA	National Mapping and Resource Information Authority
NBB	National Biofuels Board
NCCAP	National Climate Change Action Plan
NCR	National Capital Region
NEECP	National Energy Efficiency and Conservation Program
NES	National Ecotourism Strategy

NGOs	non-governmental organizations
NIPAS	National Integrated Protected Areas System
NISARD	Negros Island Sustainable Agriculture and Rural Development Foundation
NO_2	nitrogen dioxide
NOAB	National Organic Agriculture Board
NREB	National Renewable Energy Board
NREP	National Renewable Energy Programme
NSCB	National Statistical Coordination Board
NWPC	National Wages and Productivity Commission
O&M	operations and maintenance
OCCP	Organic Certification Center of the Philippines
OFSP	Organic FIELDS Support Program
PAs	protected areas
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAWB	Protected Areas and Wildlife Bureau
PDP	Philippine Development Plan
PHILGBC	Philippine Green Building Council
PPP	public-private partnership
PUB	public utility bus
PUJ	public utility jeepney
RA	Republic Act
RE	renewable energy
RPS	Renewable Portfolio Standard
SB	service bus
SFM	sustainable forestry management
SMEs	small and medium-sized enterprises
SUV	sport utility van
TDGVA	tourism direct gross value added
TLAs	Timber License Agreements
UNEP	United Nations Environment Programme
UNFCCC	United Nations Convention for Climate Change

VCOP	Virgin Coconut Oil Association of the Philippines
VOCs	volatile organic compounds

1. Introduction

This desk research report undertaken by the Institute for Global Environmental Strategies (IGES) in collaboration with the International Labour Organization (ILO) is the initial step in mapping existing green jobs in the Philippine labour market based on available published data from government as well as non-government sources. This study will contribute to building a common understanding on the linkages between economic, social and environmental policies in the Philippines including through a tripartite consultation process at all stages of project implementation. The mapping study report will bring qualitative and quantitative information on the number and types of green jobs in key sectors of the economy which will be important to prepare for the following step of the green jobs research programme in the Philippines.

The main purpose of the desk research is to propose a conceptual framework for the characterization of green jobs in the Philippines, which include clustering of economic activities and industries, selection of indicators, as well as for assessing numbers of direct green jobs at the country and local levels. The desk research was conducted to:

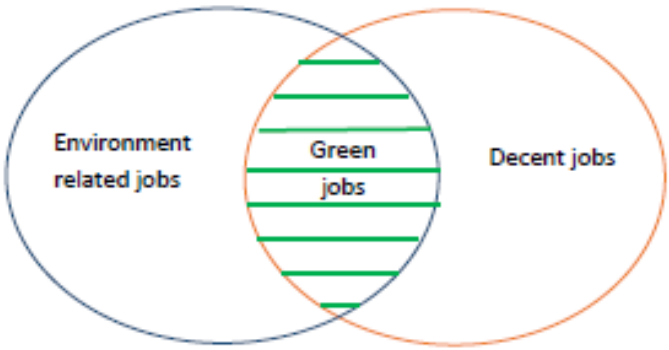
- Propose a list of key priority economic sectors and industries for the further characterization of green jobs;
- Propose clusters of key industries and economic sectors for the conduct of focus group discussions and the conduct of establishment surveys;
- Review possible indicators for the characterization of green jobs in selected economic sectors and industries, including a review of possible green products and services and practices;
- Compile existing information on the number of green jobs by selected sector on the basis of the identified indicators for characterizing green jobs; and
- Make recommendations for the conduct of the proposed establishment surveys.

1.1 Defining green jobs

The International Labour Organization (ILO) and the United Nations Environment Programme (UNEP) define green jobs as the direct employment in economic sectors and activities, which reduce their negative environmental impacts, ultimately resulting in levels that are sustainable. This includes but is not limited to jobs that work towards protecting ecosystems and biodiversity, reducing energy, materials and water consumption, de-carbonizing the economy and minimizing all forms of waste and pollution. Moreover, a job is to be a green job if it is decent work in the sense of the ILO.

The above definition is a “framework” definition for green jobs which will require further refinements at the national level and the setting of technical indicators in the environment and labour fields for further characterization. The present report will propose environment-related indicators and labour-based indicators to be considered by ILO constituents and other partners for a country-based approach on qualification and quantification of green jobs.

Figure 1. Definition of green jobs



Source: ILO, 2010.

A green job must provide decent work as well as contribute directly to lessen environmental impacts. Green jobs are identified by applying screening criteria to employment and economic data. More precisely, the screening criteria to be applied for the identification of green jobs across the economy relate to the following two dimensions of these jobs:

- environmentally sustainable activities, products and services; and
- conditions for decency of work.

Environmentally sustainable activities, products and services fall into one or more of the following six groups:

- **Mitigation actions**. These involve activities, products and services to reduce emissions of greenhouse gases (GHGs) by sources or enhance their removal from the atmosphere by sinks.[1] Mitigation actions include enhancing renewable energy supplies, promoting energy efficiency and energy conservation, prevention of direct emissions of GHGs through the prevention of deforestation, protection of natural carbon sinks, etc.
- **Adaptation to climate change and disaster risk management**. Actions include coastal management, adaptation of agricultural practices to climate change, sustainable fisheries and all forms of activities, structural and non-structural measures, geared to avoid or to limit adverse impacts of hazards.
- **Biodiversity, desertification, ecosystem services, and environmental quality based services**. All activities linked to protecting ecosystems and habitats, and prevention of land degradation from human activities.
- **Water and natural resource management**. Products and services that promote water efficiency, the sustainable use of wetlands and other systems, conservation of wildlife,

[1] A sink refers to forests, vegetation or soils that can absorb CO_2.

sustainable practices in agriculture including organic farming and crop rotations, sustainable forestry and sustainable practices in forestry management among others.

- **Pollution prevention and control.** Products and services that reduce or eliminate the creation of waste materials; collect, reuse, remanufacture, recycle, or compost waste materials or wastewater.
- **Environmental compliance, education and training, and public awareness**. These are products and services that:
    - enforce environmental regulations;
    - provide education and training related to green technologies and practices; and
    - increase public awareness of environmental issues.

1.2 Structure of the report

This report is structured as follows:

- An overview of the approach;
- An overview of the Philippine economy and structure of employment;
- An overview of the socio-economic implications of climate change in the Philippines;
- An overview of the key priority economic sectors and industries for the further characterization of green jobs;
- Review of possible indicators for the characterization of green jobs in selected economic sectors and industries, including review of possible green products and services and practices;
- Compilation of existing information on number of green jobs by selected sector on the basis of the identified indicators for characterizing green jobs; and
- Some recommendations for the conduct of the proposed establishment survey.

1.3 An overview of the approach

A number of studies have been commissioned by the ILO Country Office for the Philippines and by the Institute of Labour Studies (ILS) to provide a comprehensive background on the status of green jobs awareness, potential and readiness in the Philippines. [2] The focus of the many studies is on the "greening" of existing industries. This desk research for the Green Jobs Mapping Study in the Philippines begins with the intention of estimating actual green jobs in existing industries based on available published data and substantiated by consultations and actual surveys. The

[2] C. Cruz: *From jobs to green jobs: A just transition framework*, ILS Discussion Paper Series 01-2009 (ILS, Manila, 2009). M.G. Riguer*: Assessing the green potential and readiness: The case of the construction sector*, ILS Discussion Paper Series (ILS, Manila, 2009). A.B. Sibiran-Manalang, *et al*.: *Rapid sector scoping for green jobs in Asia Project* (ILO, Manila, 2011). R.E. Ofreneo: *Green jobs and green skills in a brown Philippine economy* (ILO, Manila, 2010).

final result of the study will establish baseline figures which may be used as a basis to draft appropriate policies promoting green jobs.

While green jobs can exist and flourish in all sectors and industries, the desk research will be limited to selected key priority sectors considering the time constraints and data availability. Similarly, the consultations with resource persons to further understand and acquire data on existing green jobs or green jobs screening criteria will be completed in clusters to more efficiently cover sectors with near-like circumstances. The approach on how to estimate existing green jobs will be streamlined so transferability to sectors not considered in the desk research will be possible.

For this desk research, a preliminary look on the general terms of linkages between the environment, including implications of climate change and the economy will be reviewed to:

- Propose a list of key economic sectors and industries for the further characterization of green jobs; and
- Propose clusters of key industries and economic sectors for the conduct of Focus Group discussions and the conduct of establishment surveys.

The method for the subsequent tasks is explained in more detail, specifically:

- The process by which sectors/sub-sectors were identified;
- How the screening criteria were developed;
- How environment-related employment was estimated, given the available data disclosing assumptions and key caveats to the job estimates; and
- How decent work was defined and its corresponding criteria were developed.

The subsequent sections in this report are structured as follows:

Task	Description	Output
Task 1	Understanding the overall structure of the domestic economy and total employment	Overview of the economic structure
Task 2	Identifying environment-related economic activity and employment	Sector profiles including total employment generated by the sector
Task 3	Developing screening criteria for identifying economic activities that support “core” environment-related employment	Screening criteria and list of identified “core” sectors
Task 4	Estimating “core” environmental employment using the screening criteria	Estimates of jobs in ”core” sectors
Task 5	Screening “core” jobs using decent work criteria	Decent work criteria and estimates of green jobs
Task 6	Summary	

Note that Tasks 2 to 5 will be undertaken for all sectors. The environmental screening criteria will be different depending on the sector being analyzed but the decent work criteria are applicable to all sectors.

1.4 Preparing sector profiles

This task considers the size and distribution of environment-related employment in the Philippine context to:

- Identify key economic sectors and activities that have strong links to the environment; and
- Prepare sector profiles explaining the structure of each sector of interest.

1.5 Developing environment screening criteria

The screening criteria attempt to cover a comprehensive set of environmental impacts including:

- Resource efficiency – reducing the resource use per unit of output;
- Energy efficiency – reducing energy consumption per unit of output;
- Abatement and mitigation – of waste and emissions;
- Adaptation and resilience – sustainable adaptation to environmental risks including disease, welfare improvement and enhancement or protection of ecosystem services; and
- Biodiversity conservation, including marine/coastal conservation.

Screening criteria of different types covering the above mentioned environmental indicators are applied sequentially to the data gathered for each sector.

- The first screening criterion is **compliance with international and/or national environmental laws**. Activities and enterprises whose performance is not consistent with national laws on pollution control, technologies, etc. cannot be considered to be providing "core environmental" jobs and need to be excluded.
- The second step is to consider implementation of **voluntary environmental standards and associated management systems** (e.g. jobs sustained by forestry management practice that is not consistent with internationally or nationally recognized (but voluntary) standards of good forest stewardship cannot be considered to be "core" environmental jobs).
- The third step is to screen for the existence of **government and/or public/private strategic plans and targets for environmental management**. These can signal national aspirations and desired direction of travel (e.g. plans for promotion of solar photovoltaic and of conversion of public transport fleets to alternative fuels).
- The fourth step is to consider **performance benchmarks or minimum performance thresholds for industries or sectors** established by the government and/or private sector (e.g. examine energy intensity (megawatt-hours, MWh/job) and include in core

employment only those jobs associated with activities that fall within the top quartile). In this instance, in circumstances where national or voluntary standards and codes are absent, the analyst is making a proposal for what constitutes 'good" environmental performance. This contrasts with the steps above where a standards-based approached is being followed.

- The final step is to consider **activity-based approaches**, whereby activities are considered as providing core environmental jobs because of their low resource use and/or positive environmental impacts (e.g. bee-keeping/honey production, climate change adaptation programmes).

It is suggested that a whole life cycle assessment be adopted especially in critical sectors to make informed decisions through a better understanding of the environmental impacts of a product's life from-cradle-to-grave and the processes or activities it underwent. The life cycle assessment approach assesses the environmental aspects and potential impacts associated with a product, process or service comprehensively to avoid a narrow outlook on environmental impacts by:

- Compiling an inventory of relevant energy and material inputs and environmental releases;
- Evaluating the potential environmental impacts associated with identified inputs and releases; and
- Interpreting the results to help make a more informed decision.

1.6 Decent work criteria

The minimum requirements for decent work are:

- Rules and regulations on minimum wage, where these are applied (i.e. in the formal economy);
- Freedom of association and the effective recognition of the right to collective bargaining;
- Elimination of all forms of forced or compulsory labour;
- Effective abolition of child labour; and
- Elimination of discrimination in respect of employment and occupation.

The minimum age for general employment is 15 years in the Philippines. Under the Child Protection Act of 1992 and the Republic Act (RA) No. 7610, however, children under 15 may be employed, provided that: the employer secures a work permit from the Department of Labor and Employment; the protection, health, and safety and morals of the children can be ensured; measures to prevent exploitation or discrimination in remuneration and work schedules are instituted; and a continuous programme for training and skill acquisitions of the child is formulated and implemented.[3] The RA No. 7658 amended section Article VIII, section 12, of Act No. 7610 by prohibiting children below 15 years of age from employment except when they

[3] *Official Gazette* (of the Senate and the House of Representatives of the Philippines), 27 July 1992. Vol. 88, No. 80.

work in a family-run company or when their participation in public entertainment is essential.[4] Moreover, under the Child and Youth Welfare Code, employers are required to submit periodic reports and maintain a register on child employees. The Bureau of Women and Young Workers is charged with enforcing child labour laws.[5] This Bureau coordinates and collaborates with non-governmental organizations and other governmental agencies, but has no inspectors. It depends on inspectors from the Labor Standards Division and the Welfare Division, but with only 197 labour inspectors, the monitoring of child labour laws remains an enormous challenge.

Under RA 6727 or the Wage Rationalization Act of 1989 and RA 6971 or the Productivity Incentives Act of 1990, the National Wages and Productivity Commission (NWPC) is the key policy making body which determines minimum wages at the regional, provincial and/or industry levels and promotes productivity improvement and gain sharing schemes, particularly among micro, small and medium enterprises.

The current regional daily minimum wage rates for non-agriculture and agriculture jobs in the Philippines as of May 2012 are presented in table 1. As initially indicated, these are minimum criteria of decent work. It can be modified following the consensus during the sectoral consultations and/or focus group discussions to better reflect the appropriateness to the Philippine context.

[4] "Philippine Congress passes child labour law," in *the Reuter Library Report*, 9 Nov. 1993. Republic of the Philippines, Congress of the Philippines, Metro Manila, Second Regular Session (26 July 1993).

[5] G. Suvarchala: "Legislation to combat child labour: An international perspective," in *Industrial Relations Journal*, Vol. 23, Issue 2, June 1992, pp. 144-154.

Table 1. Regional daily minimum wage rates for non-agriculture and agriculture in 2012

Region	Number & date in effects	Non-agriculture (Pesos)	Agriculture	
			Plantation (Pesos)	Non-Plantation (Pesos)
National Capital Region (NCR) a/	WO 16/May 26, 2011	389.00– 426.00	389.00	389.00
Cordillera Administrative Region (CAR) b/	WO 14/January 1, 2011	255.00–272.00	238.00–254.00	238.00–254.00
I c/	WO 14/January 20, 2011	228.00–248.00	228.00	200.00
II d/	WO 15/May 16, 2012	247.00–255.00	235.00–243.00	235.00–243.00
III e/	WO 16/June 24, 2011	279.00–330.00	264.00–300.00	244.00–284.00
IV-A f/	WO 15/May 15, 2012	255.00–349.50	251.00–324.50	231.00–304.50
IV-B g/	WO 05/Nov. 11, 2010	252.00–264.00	210.00–219.00	190.00–199.00
V h/	WO 15/ April 7, 2012	228.00–252.00	228.00	228.00
VI i/	WO 19/ July 15, 2011	223.00–265.00	233.00	223.00
VII j/	WO16/Sept 22, 2011	260.00–305.00	240.00–287.00	240.00–287.00
VIII k/	WO 16/June 1, 2011	253.00	228.00–234.00	213.50
IX l/	WO 17/ Nov. 25, 2011	267.00	242.00	222.00
X m/	WO 16/July 24, 2011	271.00–286.00	259.00–274.00	259.00–274.00
XI n/	WO 17/Jan. 1, 2012	291.00	281.00	281.00
XII o/	WO 17/April 18, 2012	270.00	248.00	243.00
XIII p/	WO 11/November 11, 2011	258.00	248.00	228.00
Autonomous Region in Muslim Mindanao (ARMM) q/	WO 13/ September 2, 2011	232.00	232.00	232.00

Notes:

a/ Provided PHP 22.00 COLA
b/ Granted PHP12.00 COLA
c/ Granted PHP 5.00 or 8.00 wage increase and integrated the PHP10 COLA under W.O. RB1-13 into the basic pay.
d/ Granted PHP 10.00 wage increase. Integrated to PHP15 COLA under W.O. No. RBII-10 into the basic pay.
e/ Granted additional PHP 14 COLA, the PHP4 under W.O. 15 will be integrated into the basic wage on January 1, 2012.
f/ Granted PHP2-90 wage increase for 5 years (for workers receiving below (P255); PHP12.50 Conditional Temporary

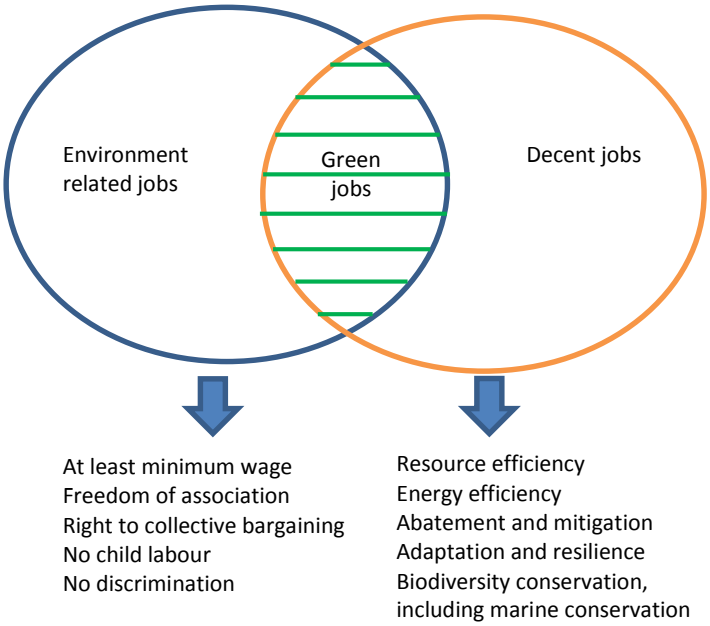
Productivity Allowance
(for workers receiving above P255).
g/ Granted PHP12 wage increase.
h/ Granted PHP3.00 - P23.00 per day wage increase.
i/ Granted PHP12.00 ECOLA for three months.
j/ Granted PHP20.00 wage increase.
k/ Granted PHP15 COLA to be given in 2 tranches: PHP10 on Jun 1 & P5 on Sept. 1, 2011; integrated into the basic pay the PHP8 COLA under W.O.14.
l/ Granted PHP12 wage increase.
m/ Integrated the PHP17 COLA effective for 6 months; to be integrated into the basic wage thereafter.
n/ Granted PHP15 COLA; PHP5 effective Jan. 1, 2012 and PHP10 effective May 1, 2012
o/ Integration of the PHP15 COLA under W.O.No. 16, Granted PHP10 COLA for Non-Agri. PHP8 COLA (upon in effect) for Agriculture sector and additional P4 (Plantation) & P6 COLA (for Non-Plantation) effective Dec. 1, 2012; PHP6 COLA upon in effect for retail/service establishments & additional PHP4 (for Retail/Service w/more than 10 workers) & PHP6 (for R/S w/ not more than 10 workers) effective Dec 1, 2012.
p/ Granted PHP11 wage increase and PHP4 COLA
q/ Granted PHP10.00 COLA.

Source: National Wages and Productivity Commission.

1.7 Estimating employment in green sectors/sub-sectors

The same set of social and environmental criteria will be applied both to formal and informal sectors to estimate green jobs. Green jobs exist both in the formal and informal employment sectors. Based on the environmental screening criteria and decent work criteria, the characterization of green jobs is illustrated in figure 2.

Figure 2. Characterization of green jobs



Source: ILO, 2010.

Figure 3. Steps required prior to estimating green jobs

Source: ILO, 2010.

1.8 Challenges and assumptions

Currently there is no labour market information on existing green jobs in the Philippines although some policies have already been implemented by public and private organizations promoting green jobs. Available data are scarce and does not necessarily correspond to the sector/sub-sector of interest. The main challenges in data handling are the following:

- **Lack of data of actual job estimates** – in many cases there is no information on job estimates in the sector/sub-sector of interest. There are also no available estimates for activities within a sector/sub-sector which has potential to generate green jobs, e.g. provision of energy efficient lighting system in buildings within the construction industry.
- **Data disaggregation** – for example, the job estimate for forestry at the national level is combined with agriculture and hunting. Similarly, the job estimate for transport is combined with storage and communications.
- **Lack of information on what has been implemented on the ground** – there is considerable information on government policy initiatives and strategies, including financing, towards climate change programmes, for example, but very little information is available on the actual projects implemented much less on the corresponding green jobs generated.
- **How to deal with job estimates of "short-term green projects"** – for example, there are cases of isolated or short-term environmental projects such as tree planting on a certain piece of land which could generate temporary jobs.

To facilitate initial estimation considering the vast data gaps in each sector of interest, the following methods are employed – using ratios, applying assumptions and considering "what-if" scenarios in sectors that have no available data on environment-related "core" sub-sectors. In

some cases, combinations of methods are applied to obtain a range of estimates. The results may unlikely reflect the actual numbers of jobs created but they may serve as initial ball park figures for consideration and then modified later after actual surveys and focus group discussions.

- **Using ratios** – in cases where the percentage of the size of environment-related "core" sub-sector relative to the whole sector size if available, it can be used to deduce the percentage of employment of the environment-related "core" sub-sector as a fraction of the sector as a whole. Similarly, data from small scale surveys establishing such ratios could be projected to the economy as a whole.
- **Using assumptions** – in some cases, it is necessary to use initial default values (e.g. assumed number of jobs created per hectare in agriculture sector) used in previous studies.
- **Using "what-if" scenarios** – in cases where there are no available data yet the government has commitments to pursue sustainable practices towards greening the sector of interest, "what-if" scenarios are applied to explore the effects on green job creation potential of the said sector.

It should be noted that in this desk research, many assumptions are made to illustrate "what-if" scenarios and should not be taken as is.

2. The economy and employment structure in the Philippines

This section provides a brief profile of the economic and employment structure of the Philippine economy including an overview on the following:

- an overview of the status of employment maintained in the economy;
- employment profiles of the different economic sectors; and
- briefing on the informal economy.

2.1 An overview of the status of employment maintained in the economy

The Philippine economy has been growing continuously in recent years albeit erratically. Philippine gross domestic product (GDP) grew 7.6 per cent in 2010 then dropped to 3.7 per cent in 2011. Growth has averaged 3 per cent annually since 1981. With population still increasing at more than 2 per cent per year, per capita incomes have risen only 20 per cent in real terms from 1981 to 2009. The economy weathered the global recession due to minimal exposure to troubled international securities, lower dependence on exports, relatively resilient domestic consumption, large remittances from about 4 million Filipino workers overseas and a growing business process outsourcing industry.

Rates of unemployment remain high averaging 7.5 per cent in 2006–10 and 10 per cent in 1990–2005.[6] There were 36.3 million employed workers and 2.9 million unemployed workers in the Philippines in 2011. About 564,000 college graduates were unemployed in 2011 and 10.5 million people were engaged in the informal sector.[7] The informal sector operators are either self-employed (about 9.1 million) without any paid employees or employer (about 1.3 million) in family-owned farms or businesses.

The Philippine Development Plan 2011–16 charters a way towards inclusive growth, aiming for sustained growth that creates jobs, draws the majority into the economic and social mainstream and continuously reduces mass poverty. Key objectives of the Plan include:

- A growth in real GDP averaging 7–8 per cent per year.
- Generate an average of one million (1,000,000) net employment annually.
- Lower the unemployment rate to 6.8–7.2 per cent.

2.2 Employment profile of the different economic sectors

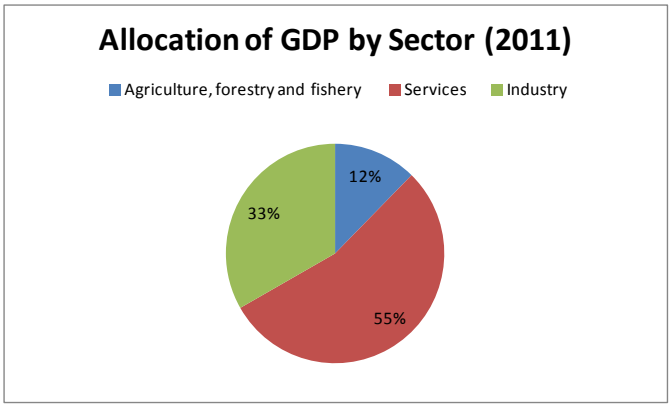
In 2011, the largest contribution to the Philippines' GDP came from the service sector (54.4 per cent) while employing about half (52.2 per cent) of the workforce. The agriculture, forestry and

[6] Note that data before and after 2005 cannot be compared because of a change in the unemployment definition adopted that year.

[7] Based on the 2008 Informal Sector Survey (2008 ISS) of the Philippines conducted by the National Statistics Office (NSO) with funding assistance provided by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

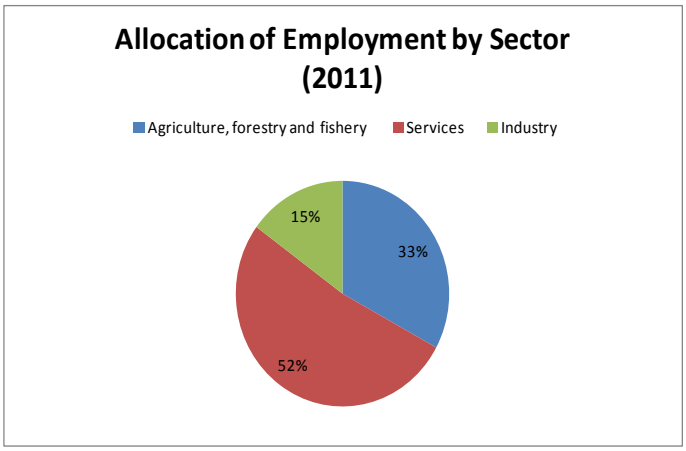
fishing sectors accounted for less than one-sixth (12.3 per cent) of GDP but absorbed about one-third (33 per cent) of the country's total employed. In contrast, the industry sector which contributed a third (33.3 per cent) to the GDP comprised only a small share (14.9 per cent) of total employed, as suggested by figures 5 and 6.

Figure 4. Allocation of GDP by sector in 2011



Source: National Statistics Office, Labor Force Survey, 2011.

Figure 5. Allocation of employment by sector in 2011



Source: National Statistics Office, Labor Force Survey, 2011.

A more detailed breakdown of employment estimates by industry and occupation in the last two years, 2011 and 2010 are presented in table 2.

Table 2. Estimates of employed persons by industry and occupation in Philippines 2010–11

Selected indicators	2011	2010
Employed persons		
Number (in thousands)	**37 191**	**36 035**
Industry sector	100.0	100.0
Agriculture	**33.0**	**33.2**
Agriculture, hunting and forestry	29.0	29.1
Fishing	3.9	4.1
Industry	**14.9**	**15.0**
Mining and quarrying	0.6	0.6
Manufacturing	8.3	8.4
Electricity, gas and water	0.4	0.4
Construction	5.6	5.6
Services	**52.2**	**51.8**
Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods	19.9	19.5
Hotels and restaurants	3.0	2.9
Transport, storage and communication	7.5	7.6
Financial intermediation	1.2	1.1
Real estate, renting and business activities	3.4	3.2
Public administration and defense, compulsory social security	5.0	5.1
Education	3.2	3.3
Health and social work	1.2	1.3
Other community, social and personal service activities	2.5	2.5
Private households with employed persons	5.2	5.3
Extra-territorial organizations and bodies	-	-
Occupation	100.0	100.0

Officials of government and special interest organizations, corporate executives, managers, managing proprietors and supervisors	14.0	13.8
Professionals	4.7	4.7
Technicians and associate professionals	2.6	2.6
Clerks	5.7	5.6
Service workers and shop and market sales workers	11.1	10.6
Farmers. Forestry workers and fishermen	15.4	15.9
Trades and related workers	7.4	7.7
Plant and machine operators and assemblers	6.0	6.3
Laborers and unskilled workers	32.6	32.3
Special occupations	0.4	0.4

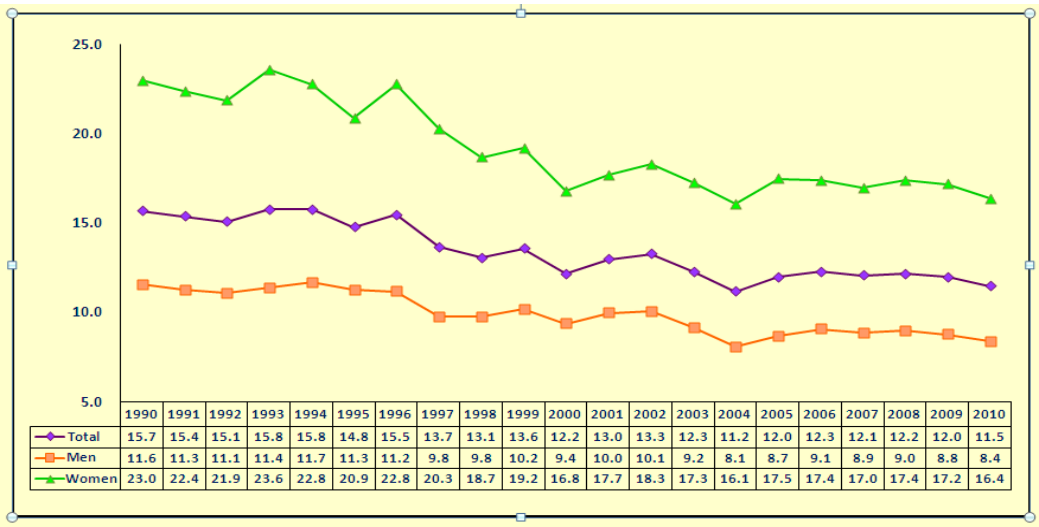
Note: Details may not add up to totals due to rounding up.

Source: National Statistics Office, annual labor and employment estimates for 2010 and 2011.

2.3 The informal sector

Measuring the prevalence of informal employment is important for understanding the distribution of economic risks and sources of income inequality, including factors contributing to the economic vulnerability of women. Informal employment is often, but not always, more precarious with lower earnings. Households which depend on informal employment for their primary source of income often face higher risks of poverty (Chen *et al.*, 2005). Based on the 2008 Informal Sector Survey, of the 10.5 million informal sector operators counted, 47.4 per cent were working as farmers, forestry workers and fishermen. Those belonging to the group of managing proprietors were the second largest group accounting for 31.2 per cent. Those involved in the wholesale and retail trade accounted for more than one-fourth (29.6 per cent) while those in transport, storage and communications were about 10 per cent. Informal sector operators are either self-employed without any paid employee or employer in own-family operated farms or businesses. The self-employed numbered about 9.1 million while the employer numbered at 1.3 million.

Figure 6. Proportion of unpaid family workers in total employment



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total	15.7	15.4	15.1	15.8	15.8	14.8	15.5	13.7	13.1	13.6	12.2	13.0	13.3	12.3	11.2	12.0	12.3	12.1	12.2	12.0	11.5
Men	11.6	11.3	11.1	11.4	11.7	11.3	11.2	9.8	9.8	10.2	9.4	10.0	10.1	9.2	8.1	8.7	9.1	8.9	9.0	8.8	8.4
Women	23.0	22.4	21.9	23.6	22.8	20.9	22.8	20.3	18.7	19.2	16.8	17.7	18.3	17.3	16.1	17.5	17.4	17.0	17.4	17.2	16.4

Notes: (a) Data from the Labor Force Survey (LFS) refer to averages of quarterly data, i.e., January, April, July and October except for 1990 which is the average of January, July and October data as April round not conducted due to the 1990 Population Census. (b) LFS data from 1990-96 were adjusted based on the 1980 Census-based population projections, those from 1997–2005 were adjusted based on the 1995 Census-based population projections and those from 2006 onwards were adjusted based on the 2000 Census-based population projections. (c) In ILO status in employment, the self-employed and unpaid family workers are classified as own-account workers and contributing family workers, respectively.

Source: National Statistics Office, Labor Force Survey, 2011.

On gender profiles, two-thirds of informal sectors were male, as shown in figure 7. Seventy-five per cent or three-fourths of the informal sector operators were in age group 35 years old and over, the largest was the age group 35–44 (27.5 per cent). Meanwhile, the age group 15–24 reported the least share (5.2 per cent). Four out of ten informal sector operators attained at most elementary level. Those who had attained high school level comprised 36.2 per cent while about 17.7 per cent had reached college level. About two-thirds of informal sector operators were household heads. By place of work, more than 40 per cent of informal sector operators worked on the farm or individual agricultural/subsidiary plots. About 16.5 per cent of informal sector operators worked at home with space inside/attached to the home.

When asked about their job satisfaction, six out of ten informal sector operators answered that they were satisfied in their job or business. Only 1.7 per cent of informal sector operators were very unsatisfied in their job or business. More than 10 per cent (11.1 per cent) of informal sector operators were in Calabarzon followed by informal sector operators in Central Luzon and Western Visayas with 8.3 per cent and 8.1 per cent, respectively. On the other hand, it reported the smallest proportion of operators (1.5 per cent).

Table 3. Agricultural employment by employment status and formal/informal sector 2009

		All agriculture		Formal sector		Informal sector		Other/own-use	
Total employment		**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
All agriculture	**Total**	10 450 506	100.0	1 065 411	100	8 414 469	100.0	970 626	100.0
	Formal	1 028 065	9.8	946 616	88.8	64 406	0.8	17 042	1.8
	Informal	9 422 441	90.2	118 795	11.2	8 350 063	99.2	953 583	98.2
Paid employees									
All employees	**Total**	2 902 581	27.8	332 551	31.2	2 367 307	28.1	202 723	20.9
	Formal	299 809	2.9	218 361	20.5	64 406	0.8	17 042	1.8
	Informal	2 602 772	24.9	114 191	10.7	2 302 901	27.4	185 680	19.1
Pvt. Enterprises	**Total**	2 870 738	27.5	327 494	30.7	2 340 983	27.8	202 261	20.8
	Formal	296 454	2.8	215 006	20.2	64 406	0.8	17 042	1.8
	Informal	2 574 284	24.6	112 489	10.6	2 276 576	27.1	185 219	19.1
Public sector	**Total**	4 672	0.0	4 672	0.4	-	-	-	-
	Formal	2 970	0.0	2 970	0.3	-	-	-	-
	Informal	1 702	0.0	1 702	0.2	-	-	-	-
Paid worker, household enterprise	**Total**	27 171	0.3	385	0.0	26 324	0.3	462	0.0
	Formal	385	0.0	385	0.0	-	-	-	-
	Informal	26 786	0.3	-	-	26 324	0.3	462	0.0
Self-employed									
Employers	**Total**	897 851	8.6	217 358	20.4	651 977	7.7	28 515	2.9
	Formal	217 358	2.1	217 358	20.4	-	-	-	-
	Informal	680 493	6.5	-	-	651 977	7.7	28 515	2.9
Own-account	**Total**	3 903 737	37.4	510 897	48.0	2 975 599	35.4	417 241	43.0
	Formal	510 897	4.9	510 897	48.0	-	-	-	-
	Informal	3 392 840	32.5	-	-	2 975 599	35.4	417 241	43.0
Cont. family	**Informal**	2 746 337	26.3	4 604	0.4	2 419 586	28.8	322 147	33.2

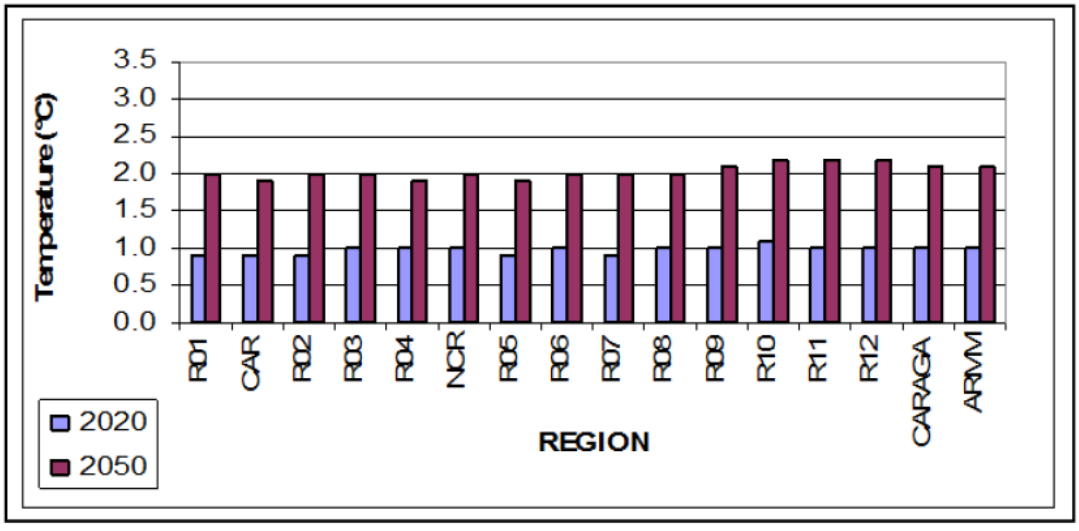
Source: The Informal Sector Survey, ISS (2009), Phase I (Philippines). Estimates produced by UNESCAP Statistics Division

2.4 Responding to a changing climate and its implications

The Philippines, a low-carbon-emitting archipelagic country of over 90 million people, now faces threats from more intense tropical cyclones, drastic changes in rainfall patterns, sea level rise, and increasing temperatures. It is expected that unpredictable catastrophes will be more frequent with global warming. The varied and mounting environmental problems facing the country – deforestation, degradation of coastal and marine resources, loss of biodiversity, soil erosion, urban congestion, deteriorating air and water quality, poor management of solid and liquid wastes, among others – exacerbate the country's vulnerability weakening its capacity to handle natural calamities and man-made disasters. All these factors contribute to serious impacts on natural ecosystems with cascading impacts on food security, natural resource management, human health, public infrastructure, energy security and human settlements.

The climate projections prepared by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) for 2020 and 2050 using a mid-range emissions scenario indicate that all areas of the Philippines will get warmer, with largest increases in temperature in the summer months of March, April and May. Mean temperatures in all areas in the Philippines are expected to rise by 0.9°C to 1.1°C in 2020 and by 1.8°C to 2.2°C in 2050. Warming will be worst in Mindanao, supposedly the country's food basket. The changes in mean annual temperature by region relative to the baseline period of 1970-2000, are provided in figure 8 below.

Figure 7. Projected changes in temperature by region for 2020 and 2050

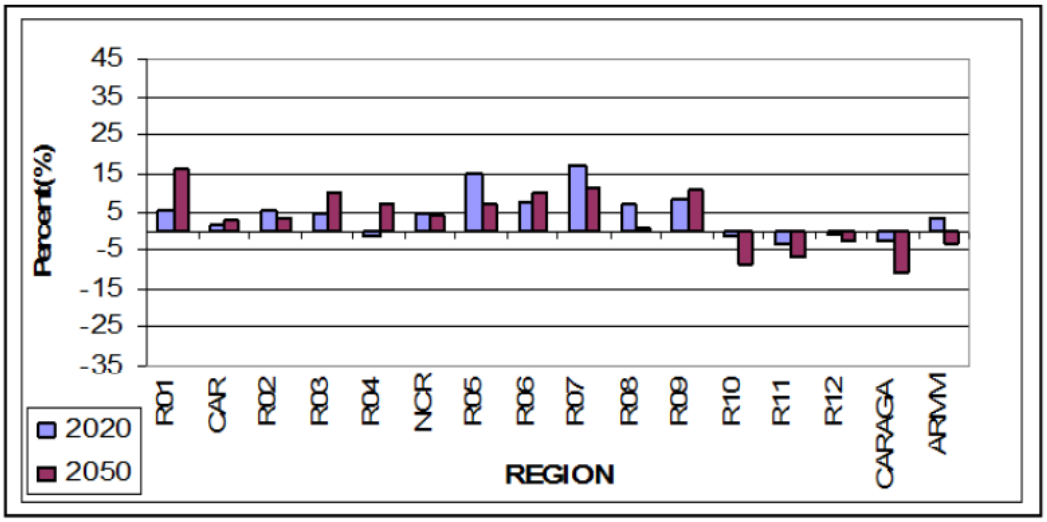


Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

The simulation also projected a change in annual precipitation from -0.5 to 17.4 per cent in 2020 and -2.4 to 16.4 per cent in 2050. Increases in rainfall are particularly evident in most areas of Luzon and Visayas, while Mindanao is projected to undergo a drying trend. Average annual

rainfall increase over most parts of Luzon and the Visayas is expected to be 2 to 17 per cent by 2020 and 1 to 16 per cent by 2050. In contrast, there is a general reduction in regional annual average rainfall in Mindanao (from 0.5 to 11 per cent by 2020; 2 to 11 per cent in 2050).

Figure 8. Projected changes by region in rainfall for 2020 and 2050



Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).

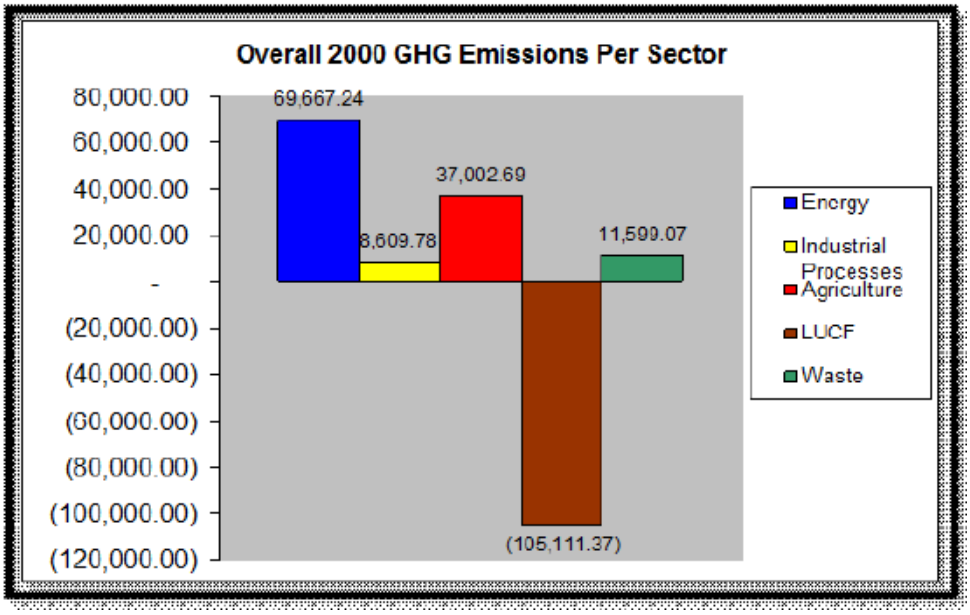
Sea level rise will increase the risk of flooding and storm damage. Projected impacts of 1 metre sea level rise in many areas of the country show vast areas being inundated, affecting coastal settlements and livelihoods. According to estimates of the National Mapping and Resource Information Authority (NAMRIA), a 1 metre sea level rise can translate to an estimated land loss of 129,114 hectares.

The Philippines' contribution to the total global GHG emissions is insignificant compared to the rest of the world. Nonetheless, the country has a mitigation strategy to contribute to the global effort to reduce emissions. The national priorities have an emphasis on adaptation as the anchor strategy in addressing climate change. Whenever possible, mitigation actions will also be pursued as a function of adaptation.

The initial National Communication submitted by the Philippines in 2000 to the United Nations Convention for Climate Change (UNFCCC), with 1994 data, identified four sectors with significant GHG emissions. These were the energy, industry, agriculture and waste sectors. The energy sector accounted for almost half of the total emissions of the country with 49 per cent. Emissions from this sector are primarily from fuel combustion from power generation and transport. The agriculture sector accounted for 32 per cent where emissions are mainly from decomposition of agricultural wastes. The industry sector accounted for 10 per cent of the total GHG emissions while the waste sector accounted for 9 per cent.

The country's second National Communication to the UNFCCC was based on the 2000 GHG inventory shown in figure 10.

Figure 9. Overall GHG emissions per sector in 2000



Source: Philippine second National Communication to the UNFCCC.

The country's key result areas for mitigation based on the 2000 GHG inventory, expected to also offer the most co-benefits to drive sustainable development, are the following:

- energy efficiency and conservation;
- renewable energy;
- environmentally sustainable transport;
- sustainable infrastructure;
- reducing emissions from deforestation and degradation (REDD+) strategy; and
- waste management.

2.5 Responding to the threats of climate change

Climate change is a stress multiplier. The underlying risks affect ecosystem degradation and compound vulnerability of human communities. For example, the concentration of climate-vulnerable dams and irrigation in Luzon, which is the location of 60 per cent of irrigated rice production, will definitely weaken the overall resilience of the country's national food security and self-sufficiency to climate change, including increasing problems on water allocation and prioritization for water supply for irrigation, domestic water supply, and energy requirements. The government enacted the Climate Change Act (RA 9729) in 2009 to provide the policy framework with which to systematically address the growing threats of climate change on

community life and its impacts on the environment. The Climate Change Act established the Climate Change Commission and allocates budgetary resources for its functions.

The Climate Change Commission drafted the National Framework Strategy on Climate Change 2010–22 to ensure and strengthen the adaptive capacity of natural ecosystems and human communities to climate change. The Framework aspires to chart a cleaner development path for the Philippines, highlighting the mutually beneficial relationship between climate change mitigation and adaptation. The national climate change framework strategy has recently been translated into a National Climate Change Action Plan (NCCAP), which prioritizes food security, water sufficiency, ecosystem and environmental stability, human security, climate-smart industries and services, sustainable energy, and capacity development as the strategic directions for 2011 to 2028.

Table 4. National Climate Change Action Plan strategic directions for 2011–28

Priorities	Outcomes
1. Food security	The objective of the national strategic priority on food security is to ensure availability, stability, accessibility, and affordability of safe and healthy food amidst climate change.
2. Water sufficiency	In light of climate change, however, a comprehensive review and subsequent restructuring of the entire water sector governance is required. It is important as well to assess the resilience of major water resources and infrastructures, manage supply and demand, manage water quality, and promote conservation.
3. Environmental and ecological stability	Ecosystem resilience and environmental stability during the plan period is focused on achieving one immediate outcome: the protection and rehabilitation of critical ecosystems, and the restoration of ecological services.
4. Human security	The objective of the human security agenda is to reduce the risks of women and men to climate change and disasters.
5. Climate-friendly industries and services	NCCAP prioritizes the creation of green and eco-jobs and sustainable consumption and production, it also focuses on the development of sustainable cities and municipalities.
6. Sustainable energy	NCCAP prioritizes the promotion and expansion of energy efficiency and conservation; the development of sustainable and renewable energy; environmentally sustainable transport; and climate-proofing and rehabilitation of energy systems infrastructures.
7. Knowledge and capacity development	The priorities of the NCCAP on knowledge and capacity development are: • Enhanced knowledge on the science of climate change; • Enhanced capacity for climate change adaptation, mitigation and disaster risk reduction at the local and community level; and • Established gendered climate change knowledge management accessible to all sectors at the national and local levels.

Source: Climate Change Commission of the Philippines.

The Philippine Government appropriated US$1.576 billion for direct and indirect climate change programmes in various sectors as shown by data from 2004–09 in table 5 while the external

multilateral and bilateral sources provided US$0.509 billion in direct and indirect grants and US$0.354 billion in direct and indirect loans or a total of US$0.863 billion.[8]

Table 5. Government budgets for direct and indirect climate change mitigation and adaptation

Sector	2003–04	2005–06	2007	2008	2009
Agriculture	111 499 114	73 230 418	162 317 397	27 653 476	2 809 630
Biodiversity	7 569 465	8 998 284	14 558 654	10 495 298	17 903 435
Climate change	22 380	24 309	40 675	278 065	1 074 457
Disaster management	27 370 923	108 797 145	212 052 315	278 065	1 074 457
Energy	2 180 018	12 258 564	18 354 608	5 824 319	4 722 783
Environment	18 558 100	32 475 436	32 131 740	9 452 328	38 315 848
Fisheries, coastal and marine resources	32 094 041	8 066 836	5 921 398	18 371 834	12 472 826
Forestry	23 409 317	24 169 309	39 509 587	52 622 452	78 824 022
Land use	12 356 882	36 364	36 846	10 270 101	5 691 065
Science and technology	33 210	22 844 818	17 192 125	1 410 011	18 438 326
Water supply and sanitation	130 443	32 727	38 944	23 847	4 645 391
Total	**235 223 893**	**290 934 212**	**502 154 288**	**257 384 319**	**224 458 087**
% of total budget	**1.59**	**1.76**	**1.96**	**0.93**	**0.7**

Source: REECS, 2010.

2.6 List of key economic sectors and industries for the further characterization of green jobs

Green jobs can exist and flourish in all sectors. To illustrate, the following sectors have been selected to elaborate under what conditions green jobs exist. Green jobs will be found where there are measures taken to: a) introduce low carbon policies; b) adapt to climate change; c) reduce resource use and energy; and d) protection biodiversity, etc. Based on a review of the Philippine economy, job generation of key sectors and priority key areas identified to

[8] The Philippine figure may even be underestimated by as much as US$0.354 plus interest since loans are actually internally provisioned resources because they will have to be paid at some future time (REECS, 2010).

mainstream climate change in the country's development plan, the following sectors and industries are selected for the further characterization of green jobs:

- agriculture;
- fisheries;
- forestry;
- energy (renewable energy);
- construction (buildings);
- transport;
- manufacturing;
- services;
- tourism; and
- solid and wastewater management.

Agriculture, including forestry, is the main livelihood base for 35 per cent of the country's labour force, while 60 per cent of the country's coastal population relies on marine resources for a living. The World Bank calculates that 85 per cent of the country's gross national product (GNP) comes from sectors at risk from rising temperatures and weather variability (Garcia Rincón and Virtucio, 2008).

Energy, construction, transport, and waste management are critical sectors for development growth, both for their contribution to the economy and job creation, which could also deliver climate mitigation co-benefits. Energy efficiency and conservation is a strategic pathway towards low-carbon development and its application in manufacturing, services and other high energy consuming sectors must be promoted. Tourism, specifically focusing on ecotourism, deals with biodiversity (including marine) conservation and its linkages with other sectors are equally important.

The selected sectors are also priority areas under the Philippine Development Plan. It means that sufficient government and external funds could be channelled to these sectors, so it is important that the corresponding jobs to be created will be green or at least be instrumental in greening the industry.

The environment and decent work screening criteria to characterize the green jobs in the selected sectors will be discussed in more detail in the subsequent sections.

2.7 Key industry clusters and economic sectors for discussions and surveys

The proposed clustering of key industries and economic sectors for the focus group discussions and establishment surveys are as follows:

- Cluster 1: Agriculture, forestry, fisheries.
- Cluster 2: Energy, manufacturing.
- Cluster 3: Transport, construction.

- Cluster 4: Solid and wastewater management, tourism, services.

The rationale for this clustering is to combine sectors with common opportunities and challenges either inherent to the respective sectors or on its strategies to tackle adaptation to climate change, resource efficiency, energy efficiency, etc. so the familiarity could facilitate better exchange of ideas, data and experiences among the key resource persons during the clustered focus group discussions. Cross-cutting areas such as biofuels (agriculture-energy-transport) and marine ecotourism (fisheries-tourism) will be captured in one of the clusters with cross reference to avoid double-counting.

3. Proposed key economic sectors and industries for further characterization of green jobs including identified sub-indicators and screening criteria

The National Climate Change Action Plan envisions a climate-resilient Philippines with healthy, safe, prosperous and self-reliant communities with thriving and productive ecosystems while the Philippine Development Plan 2011–16 and Philippine Labor and Employment Plan 2011–16 aims for inclusive growth through decent and productive work. To achieve this, it is better to include the employment component in the development plans to form part of an effective response to changing conditions with climate change and the transition towards a green economy. There is a need for better integration of the employment and livelihood dimensions into climate and other environment-related policies, while also a need to green employment and social policies and ensure these also contribute to the environmental agenda.

3.1 Agriculture

Though its share of the economy has declined over time, agriculture is still an important economic sector in the Philippines in employment terms. The contribution of the agricultural sector to GDP in the Philippines stood at an average of 18.4 per cent for the years 2004 to 2010, and employed an average of 11.8 million people accounting for about 35.1 per cent of the total workforce. If the whole agriculture value chain is considered, i.e. considering agro-processing, agricultural inputs manufacturing and trading along with basic agricultural production, the contribution to GDP and total employment would reach 35 per cent and 50 per cent respectively.[9] It is critical to the country's prospects for food security and poverty alleviation.

3.1.1 Importance of the sector and key trends

- Agriculture remains the country's backbone for the sustainable attainment of food security. In 2010, the agriculture sector produced 15.77 million metric tonnes of rice, 6.37 million metric tonnes of corn, 60.9 metric tonnes of other crops, and 4.20 thousand metric tonnes of livestock and poultry.
- In terms of land area, a total of 4.8 million agricultural farms in the country occupy 9.7 million hectares (2002 Census of Agriculture and Fisheries). These account for almost 32 per cent of the total land area of the country. The top four crops with the largest hectares under cultivation are coconuts (3.33 million hectares), followed by rice (2.47 million hectares), corn (1.35 million hectares), and sugarcane (0.36 million hectares).
- Growth has been cyclical due to the sector's increasing vulnerability to extreme weather events. About 5–7 per cent decline in yield of major crops in the Philippines is attributed to climate change. From 1990 to 2006, the average annual value of damages to agriculture is

[9] Philippine Development Plan, 2011–16.

pegged at Philippine Peso (PHP) 12.43 billion, wherein: (i) 70.3 per cent were caused by typhoons; (ii) 17.9 per cent by droughts; and (iii) 5 per cent by floods.

- Agricultural employment in the Philippines is dominated by informal employment. Total agricultural employment for the formal sector (formal enterprises and farms) is 1,065,411 compared to total agricultural employment for the informal sector of 8,414,469 (of which 8,350,063 is also informal employment) in 2009. Own-account workers and contributing family workers account for the bulk of agricultural employment in the informal sector, although there are an estimated 2,340,983 paid employees in the informal agricultural sector (the vast majority of which are also in informal jobs).
- There is also a significant agricultural wage labour force and much of this is employed by informal farms and agricultural enterprises (including fishing). Only about 327,000 individuals are paid employees hired by formal agricultural enterprises.
- The agriculture sector accounts for the majority of the Philippine's poorest, an estimated 66 per cent, as farms are characterized by stagnating productivity and declining farmer's income. On average, annual incomes of farm households are almost 30 per cent lower than the average family income in the Philippines. Poverty incidence among farmers was estimated at 44 per cent in 2006.

3.1.2 Key trends towards sustainability

To address the long standing problems besetting the agriculture sector including: (i) declining farm productivity; (ii) declining incomes; (iii) deteriorating condition of the environment; and (iv) increased health risks of farmers and the consuming public, sustainable, organic and ecological agriculture is increasingly being mainstreamed in official government policy as a key strategy for broad-based growth and development. While some arguments remain on the overall impact whether organic agriculture can feed the masses and ease poverty as there are various counter facts including yields are often lower than those from conventional farming; market channels of certified products are often limited, and products with price premiums are not necessarily targeting households with lower incomes, the study aims to capture emerging/additional potential for green jobs that accompanied with environmental as well as health benefits. Among the notable policies undertaken within the past ten years are:

- **Executive Order (EO) 481 of 2005:** This Presidential directive declared organic agriculture as a state policy and seeks its development and promotion nationwide. The EO created the National Organic Agriculture Board (NOAB) as a mechanism for the formulation of policies, programmes and projects on organic agriculture. The NOAB is composed of representatives from national line agencies, farmers, producers, traders and non-governmental organizations (NGOs).
- Department of Agriculture **Special Order 470 of 2008:** The **Organic FIELDS Support Program (OFSP)** was a complementary programme to the Department of Agriculture's (DA) Rice Self-Sufficiency Program that trained and organized a targeted number of farmer beneficiaries on organic fertilizer production and organic farming. It also promoted awareness and strengthened partnerships between DA, local government units

(LGUs), NGOs, community based organizations and academia around sustainable agriculture. Complementing this project was a commitment by the DA to convert 10 per cent of Philippine rice lands into organic farms.

- **Republic Act (RA) 10068: The 2010 Philippine Organic Agriculture Law RA 10068** is the law that governs organic agriculture in the Philippines. It provides for a clear appropriation in the DA's annual budget for the support and promotion of the country's organic agriculture programme. It instituted mechanisms for national and local implementation of organic agriculture that involves national line agencies and local government units. The participation of citizens in the development, implementation and monitoring of plans to be pursued by the national government for organic agriculture is also guaranteed. The law also prescribes guidelines for labelling and certification procedures for organic agriculture products.
- **Department of Agriculture's Agri-Pinoy:** Is the ongoing strategic framework being pursued by the incumbent leadership of the Philippine DA which seeks to improve the condition of Philippine agriculture and achieve food self-sufficiency within the next three years. The programme is rooted on sustainable farming systems and seeks to promote interventions that would increase productivity and ensure sustainability of resources and at the same time minimize the dependence of the country on food imports. The programme also includes the promotion of agriculture among the next generation of Filipinos.
- **Philippine Development Plan (PDP) for 2011 to 2016:** The PDP serves as the development blueprint of the Philippine Government. Under its chapter on agriculture, the PDP has recognized as a key national strategy the promotion of environment friendly sustainable production systems, such as organic agriculture and good agriculture practices. The Plan incorporates climate change as a cross cutting strategy to address the problems besetting Philippine agriculture. The new PDP also prescribed as one of its legislative agendas the enactment of a Food Safety and Labeling Law.

3.1.3 Identified sub-sectors and screening criteria

There are several sustainable agriculture systems practiced in the Philippines in contrast to conventional or chemical farming. These systems can be considered as part of an overall process towards conversion to full organic agriculture although they can be treated as a distinct and viable agriculture approaches. The following list and table are the prevalent modes of sustainable, organic and ecological agriculture practiced in the Philippines:

- **Balanced Fertilization System (BFS)**: a sensible use and combination of organic and inorganic fertilizers to address the increasing costs for fertilizers while sustaining the targeted optimum yield.
- **Low External Input Sustainable Agriculture (LEISA):** combines the best traditional inputs with organic, mineral, and inorganic sources to suit crop and soil requirements in order to attain higher agricultural yields.

- **Biodynamic Farming:** activates the life of the soil and plants through the application of substances derived from animal manure, herbs and mineral in very small amounts.
- **Organic Agriculture:** a system that dramatically reduces external inputs by refraining from the use of chemical fertilizers, pesticides and pharmaceuticals and a system of crop cultivation that uses biological methods of fertilization and pest control.

Table 6. Sustainable sub-sectors in the agriculture sector and environmental screening criteria

Sub-sector	Proposed screening criteria	Justification
Organic agriculture	**Government regulations:** Philippine National Standard on Organic Agriculture (PNSOA) Key players: Department of Agriculture with the Bureau of Agriculture and Fisheries Products Standards	Organic certification in the Philippines is fundamentally based on the PNSOA. During the time it was being formulated, it was informed by IFOAM Basic Standards and the Codex Guidelines for production, processing, marketing and labelling of organically produced foods (CAC/GL 32). It was developed with due consultation from national line agencies like the Department Trade and Industry, member networks of the Organic Certification Center of the Philippines (OCCP) and organic agriculture advocates and practitioners.
Organic agriculture	**Private standard:** Local third party certification: OCCP	Organic Certification Center of the Philippines (OCCP) is the only accredited third party certifying body in the Philippines. Their certification, however, is only recognized locally. To assist in certifying organic products for exports, OCCP has established a partnership with foreign certifying bodies such as Ceres-Cert and Certification Alliance.
Organic agriculture	**Private standard:** Foreign certifying bodies: CERES-CERT ECO CERT NATURLAND SGS DOALNARA Certification Alliance BCS-OEKO	**CERES-CERT** - A foreign certifying body based in Germany and a partner of the OCCP for international certification of organic products. It complies with EU Standards, US National Organic Program, Japanese Agricultural Standard, and Global Gap. **ECO CERT** – An organic certifying body based in France. Among the seven, Ecocert is the most active in providing certification and inspection in the Philippines. It complies with EU Standards, US - National Organic Program, and Japanese Agricultural Standard. **NATURLAND** – An association for organic agriculture based in Germany. Naturland provides certification for organic products exported by the Philippines to the EU. It complies with EU Standards, US - National Organic Program and IFOAM Basic Standards. **SGS** – A company based in Switzerland that provides organic certification in the Philippines for export following the ISO Guide 65/EN4501 by the Dutch Accreditation Agency. **DOALNARA** – An organic certifying body based in Republic of Korea which complies with IFOAM Basic Standards. **Certification Alliance** – An international partnership of organic certification bodies, inspectors and supporting development organizations. Currently a partner of the OCCP. It complies with EU Standards, US National Organic Program, and Japanese Agricultural Standard. **BCS-OEKO** – An independent and private controlling agency which certifies organic products worldwide in accordance with international regulations and private standards. It complies with EU Standards, US

		National Organic Program, and Japanese Agricultural Standard.
Beekeeping	**International regulation:** Article 4.15.1 of the Terrestrial Code of the World Organization for Animal Health	Describes the official control of bee diseases to include an organization for permanent health surveillance, approval of breeding apiaries for export, measures for cleaning, disinfection and disinfections of apicultural equipment, and rules precisely stating the requirement for issuing an international veterinary certificate. Promoted by the Department of Agriculture through a collaboration between the Bureau of Animal Industry and the National Apiculture Research, Training and Development Institute.
Mushroom cultivation	**Benchmarks:** Compliance with environmental regulations	Promoted by the Department of Science and Technology.
Soil conservation	**Government guidelines:** Compliance with guidelines set by the Bureau of Soils and Water Management	Soil conservation in croplands and other agricultural areas.
Water conservation	**Government guidelines:** Compliance with measures and guidelines set by the Bureau of Soils and Water Management	Small scale irrigation projects implemented by the Bureau of Soils and Water Management.

3.1.4 Estimating environment-related employment

The organic industry in the Philippines is in its early stages of development but is making rapid progress from a low base. Estimates in 2006 indicated that the area under organic management is 14,140 hectares or 0.12 per cent of the total agricultural area, with about 35,000 organic farms (Sarmiento, 2007). Exports of Philippine organic products are estimated to have reached US$18 million in 2006 (Cruzada, 2012). The majority of the crops organically grown in the Philippines are fruits and sugarcanes that target the export market.

The total number of workers employed in organic farming cannot be estimated directly due to an absence of reliable official data. A rough estimate can be extrapolated based on the ratio of agricultural land area allocated to organic farming relative to the whole agriculture sector vis-a-vis the employment generated by the whole sector which yields 14,160 jobs, which also loosely translates as 1 hectare of land can generate one job.

Anecdotal information from the scoping exercise to assess the readiness of the organic farming sector for green jobs and decent work in 2011 mentioned that about 1–2 per cent of farmers practice organic farming (Siriban-Manalang *et al.*, 2011). This is equivalent to 118,000–236,000 jobs.

Estimates can be further verified during discussions by inviting a resource person from the sub-sector. Most companies engaged in organic farming are categorized as micro-enterprises; there are very few medium-sized companies. Some key players (industry associations) in the Philippines are listed below.

MASIPAG (Magsasaka at Siyentipiko Para Sa Pag-unlad Ng Agrikultura or Farmer-Scientist Partnership for Development) is an NGO, and one of the oldest organizations engaged in sustainable agriculture. MASIPAG provides services through farmer-to-farmer extension. MASIPAG is best known for its rice varieties, known as MASIPAG rice varieties throughout the country. At present, MASIPAG has a total of 456 base peoples' organizations, 42 NGOs, and 15 individuals in its pool of researchers/scientists.

VCOP (Virgin Coconut Oil Association of the Philippines) is an association of producers and traders, established in 2004. The VCOP promotes the industry's development in partnership with the Department of Trade and Industry particularly when they started participating in the Export Development Council (EDC) group under the National Cluster Team.

Other new players have emerged as organic agriculture becomes more popular due to various promotional initiatives, training programmes, conferences and advocacy. Among these are:

NISARD (Negros Island Sustainable Agriculture and Rural Development Foundation, Inc.) whose vision is to make Negros Island the "organic food basket of Asia". Another NGO engaged in organic agriculture development is PDAP (Partnership for Development Assistance in the Philippines Inc.) with its banner PRIME or Promoting Rural Industries and Market Enhancement Program. It supports the sustainable development of small and medium enterprises and rural industries such as organic rice, sugar and seaweed. Others are Altertrade; AVDF (Alliance of Volunteers for Development Foundation); SIBAT (Sibol ng Agham at Teknolohiya) and some church-based organizations (social action centres).

3.1.5 Decent work

Agricultural employment as a whole in the Philippines can be characterized as being highly informalized and dominated by small producers employed as own-account workers, mostly men, and contributing family workers, mostly women.

Based on the FGDs conducted in 2011 with organic farmers, most of the participants in the MASIPAG organic farming programme and sustainable agriculture programme are small farmers, cultivating an individual farm area of one (sometimes less) to two hectares. These small farmers use their own labour, supplemented by the contributions of family members and paid groups of workers (less than ten) during harvest and planting seasons. It could not be qualified that all jobs in organic farming are decent work in this case. In cases where the basis of assumptions are based on export quality certified products, it may be safe to assume that those jobs created by producing export quality organic products are decent jobs.

3.1.6 Estimating green jobs

Based on the discussions above, a rough estimate of green jobs from organic agriculture can be pegged at a low of 14,160 jobs based on 2006 figures to about 118,000 jobs, assuming at least 50 per cent of organic farmers satisfy the decent work criteria.

3.2 Construction

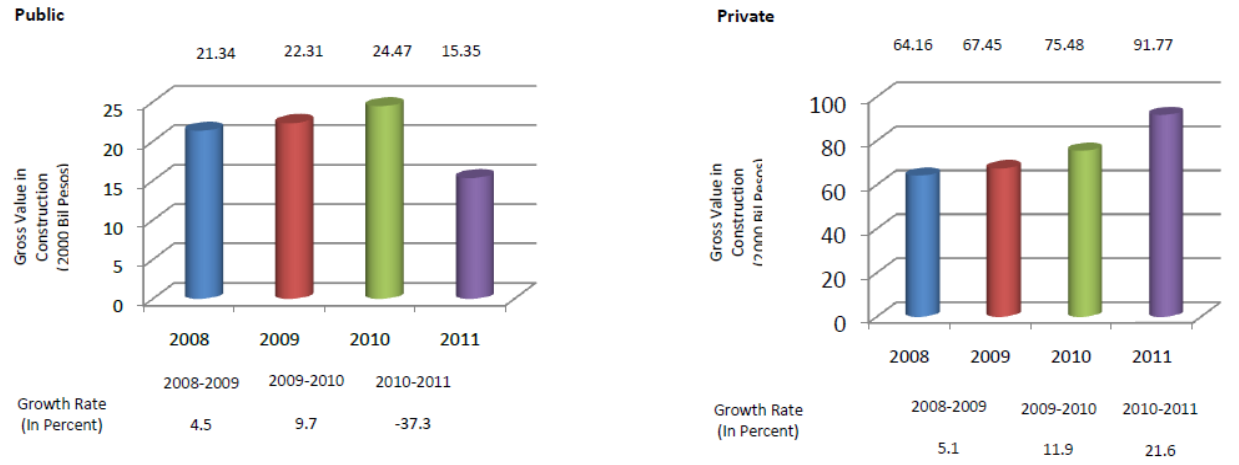
A continuous strong demand for housing and the tourism industry as well as the potential of public-private partnerships (PPP) maintain growth in the construction industry. Data from the construction industry of the Philippines indicate that from 2006 to 2010, the share of the construction industry to total GDP was 5.2 per cent on average. It showed a 4 per cent growth during the first semester of 2011. Total investments as measured by gross capital formation (GCF) reached PHP1,184 billion in 2010, an increase of 32 per cent from 2009. As more investments entered the economy, the construction industry also increased its output. For 2011, the share on the construction industry was continuously increasing for the first and second quarters at 5.9 per cent and 10.5 per cent, respectively.

On the average, the construction industry supplies five per cent (5 per cent) of the total domestic employment annually (equivalent to around 1.9 million workers today). The average construction employment in the first quarter of 2011 grew by 1.7 per cent. Despite the political crisis in the Middle East and North Africa, foreign exchange earnings from construction amounted to US$17.523 million in the first three months of 2011, a 72.6 per cent increase from US$10.151 million in the same period of 2010. Such an increase reflected the late remittances of the fourth quarter of 2010 (Philippine Contractors Association, n.d.).

3.2.1 Importance of the sector and key trends

Construction output, as measured by the gross value added (GVA) amounted to PHP68.2 billion in real terms, a 4.0 per cent growth from the real value of PHP65.6 billion during the first quarter of 2010. The gains in the construction performance were boosted by the rebound in private construction activities as well as the sustained support of the private sector for infrastructure investment and development.

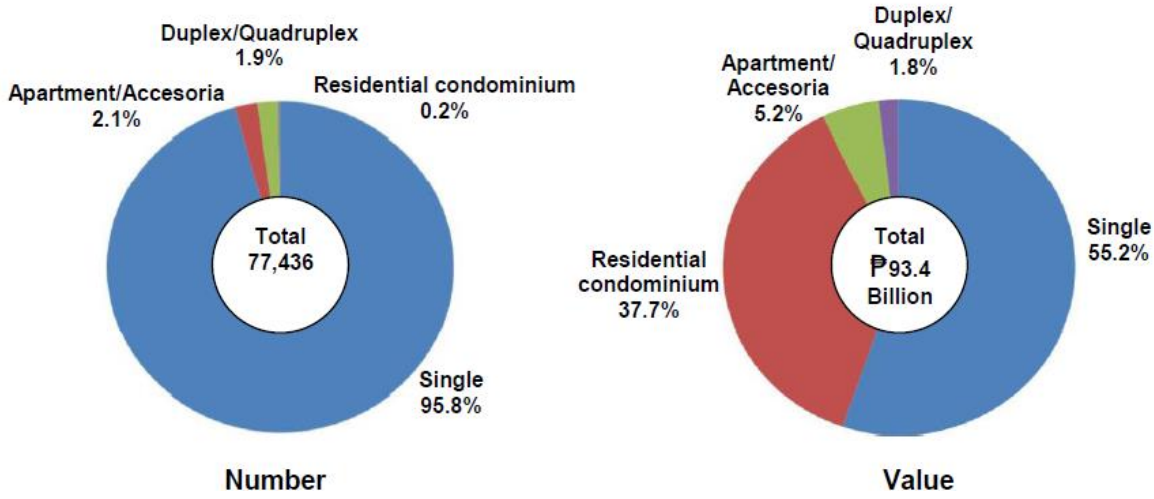
Figure 10. Trends in public and private investment 2008–11



Infrastructure investments by the government (valued at PHP15.4 billion in real terms) declined by 37.3 per cent due to the under spending by the government in public construction activities. Public sector construction activities are expected to decline until tax revenues increase. Meanwhile, private construction activities (valued at PHP91.8 billion in real terms) accelerated by 21.6 per cent due to the sustained growth of investments in both residential and non-residential construction and were buoyed by the planned implementation of infrastructure projects under the public-private partnership scheme of the government.

The total number of approved building permits for residential and non-residential units for the year 2010 was recorded at 14,623, comprising 12.9 per cent of the total number of approved building permits for the country at 113,230. The total floor area for approved building permits for residential and non-residential units for 2010 was estimated at 8.7 million square metres, representing 39.6 per cent of the total floor area for the Philippines which was estimated at 22.1 million square metres. Aggregate value of construction for the approved building permits for residential and non-residential units was estimated at PHP99.5 billion for 2010. This accounted for 49.6 per cent of the aggregate value of construction for the Philippines which was recorded at PHP200.3 billion.

Figure 11. Number and value of residential construction by type in 2010



Source: Industry Statistics Division, NSO.

Dubbed as the "mother of all industries", the construction sector creates extensive linkages with other industries. Its growth and impact on the economy goes well beyond the direct contribution of building activities. It supports the materials sector by increasing demand for inputs such as cement, stone, ceramics, metals, wood, and steel among others. A group of professionals like architects, engineers, designers, and the like also depend on the industry. The benefits also

extend to important drivers of the economy such as manufacturing, real estate and housing, and services; most especially business process outsourcing (BPO), tourism and mining.

Residential construction accounts for about 70 per cent of all building construction in the Philippines. Of the total residential construction, single houses account for 95.8 per cent, duplex/quadruplex 1.9 per cent, apartments 2.1 per cent and condominiums 0.2 per cent. The wide disparity between the number of single houses and condominiums does not mean that more people live in single houses. A single house is intended for a single family or household while a single condominium building can accommodate hundreds of occupants or families. Also, some condominiums are even clusters of buildings.

The Philippine Development Plan 2011–16 targets for the housing sector to provide 1.47 million units of direct housing assistance from 2011 to 2016 and envisions increasing this volume to 5.7 million houses by 2016. Corollary to the global Millennium Development Goals (MDGs) on ensuring environmental sustainability which aims to achieve significant improvement in the lives of at least 100 million slum dwellers worldwide by 2020, the National Slum Upgrading Strategy was formulated as a key component of the socialized housing programme. Recognizing the need to meet the housing demand as the country develops economically, a sustainable strategy has to be in place since current residential and commercial sectors are major producers of GHGs. They consume 50 per cent of primary electric energy: 27 per cent is consumed by households, while 23 per cent is consumed by the business sector. High-rise buildings consume most (72 per cent) of electricity supply and 17 per cent of fresh water. Buildings contribute 33 per cent of the carbon dioxide emission of human settlements. Making these buildings energy- and water-efficient would, therefore, be critical component of mitigation. The full implementation of a standard for green buildings would minimize the release of GHGs by as much as 2,400,000 tonnes of carbon dioxide (CO_2) a year.

3.2.2 Key trends towards sustainability

The National Framework Strategy on Climate Change envisions reducing the carbon footprint through energy-efficient design and materials for public infrastructure and settlements through the following strategic priorities: (i) institutionalise guidelines for the construction of innovative climate-resilient and energy-efficient human settlements; (ii) promote green infrastructure practices through climate-smart technologies, climate proofing processes and construction of energy-efficient buildings; (iii) install energy-efficiency and climate-proofing mechanisms for public infrastructure, cultural facilities, and socio-economic infrastructure (including telecommunications facilities) through appropriate standards and inventory mechanisms; and (iv) develop energy-efficient and climate-resilient human settlements through government and private sector housing programmes, and public awareness campaigns.

The National Energy Efficiency and Conservation Program was launched in August 2004 to promote the continuous implementation and expansion of the appliance and equipment energy standards and of building energy usage standards. It plans to further strengthen the

implementation of energy efficiency and conservation programmes through the promotion of saving and efficient utilisation of energy in the economy in the period 2005–14.

Guidelines on Energy Conserving Designs of Buildings were made available in 2007. Note that this guideline is a reference document of the National Building Code. The Green Building Act is promoted by the Philippine Green Building Council (PHILGBC) which established green building standards for planning, design, construction, operation or maintenance practices, renovation, expansion and retro-fitting of government building projects.

The **BERDE (Building for Ecologically Responsive Design Excellence)** Program was initiated by the PHILGBC to facilitate greener buildings designed to measure how much "above and beyond" existing environmental regulations and standards a building is performing. Best practice in design and construction, both local and international were observed and made part of the BERDE. In the course of the development of BERDE, the Green Building Council Australia and the World Green Building Council has provided significant assistance through consultations with Green Star Professionals and tours to exemplars of green building in the region. With BERDE, the construction industry now has a common language for greener building. BERDE addresses local environmental priorities through integrated design delivery and a whole building design approach. The public may now easily identify greener buildings in the market through a well balanced, unbiased, and credible measurement of performance.

Some of the best practices in the construction sector include:

- optimal site location and aesthetic design;
- structural design efficiency;
- water efficiency;
- materials efficiency;
- indoor environment quality (e.g. ventilation);
- operations and maintenance optimization;
- waste reduction and/or prevention;
- reduction, if not, elimination of virgin material requirements;
- recycling of materials;
- use of environmentally preferred products; and
- ultimate disposal.

Optimal site location and aesthetic design

Designing environmentally optimal buildings would require the ways to minimize the total environmental impact associated with all life-cycle stages of the building project. However, buildings are much more complex products and they require a multitude of materials and components, each constituting various design variables to be decided at the design stage. A variation of every design variable may affect the environment during all of the building's relevant life-cycle stages (Hegazy, 2002; Pushkar, Becker and Katz, 2005).

Structural design efficiency

Various strategies employed to reduce operating energy use are the installation of high-efficiency windows and insulation in walls, ceilings, and floors which increase the efficiency of the building envelope, (the barrier between conditioned and unconditioned space), passive solar building design, which is often implemented in low-energy homes, placing awnings, porches, and trees (Simpson, 2002) to shade windows and roofs during the summer while maximising solar gain in the winter, effective window placement (day lighting) to provide more natural light and lessen the need for electric lighting during the day, and solar water heating which further reduces energy costs.

Water efficiency

Water conservation/efficiency strategies include the design for dual plumbing to use recycled water for toilet flushing or a grey water system that recovers rainwater or other non-potable water for site irrigation and minimizing wastewater by using ultra low-flush toilets, low-flow shower heads, and other water conserving fixtures.

Materials efficiency

Green building materials include lumber from forests that have been certified to a third-party forest standard, rapidly renewable plant materials like bamboo and straw, insulating concrete forms, dimension stone, recycled stone, recycled metal, and other products that are non-toxic, reusable, renewable, and/or recyclable (e.g. linoleum, sheep wool), panels made from paper flakes, compressed earth blocks, adobe, baked earth, rammed earth, clay, vermiculite, flax linen, sisal, seagrass, cork, expanded clay grains, coconuts, wood fibre plates, and calcium sandstone. The use of recycled industrial goods, such as coal combustion products, foundry sand, and demolition debris in construction projects has also been recommended. Building materials should be extracted and manufactured locally to the building site to minimize the energy embedded in their transportation.

Indoor environmental quality

Buildings rely on a properly designed ventilation system to provide adequate ventilation (passively/naturally- or mechanically-powered) and air filtration as well as isolate operations (kitchens, dry cleaners, etc.) from other occupancies to reduce volatile organic compounds (VOC), and other air impurities such as microbial contaminants. During the design and construction process choosing construction materials and interior finish products with zero or low emissions will improve indoor air quality. Many building materials and cleaning/maintenance products emit toxic gases, such as VOCs and formaldehyde. These gases can have a detrimental impact on occupants' health and productivity as well. Avoiding these products will increase a building's indoor environmental quality (IEQ).

Operations and maintenance optimization

Ensuring operations and maintenance (O&M) personnel in the project's planning and development process will help retain the green criteria designed at the onset of the project. Every aspect of a green building is integrated into the O&M phase of a building's life. Operations and maintenance optimization happen when new or additional green technologies or processes are applied or utilized. Although the goal of waste reduction may be applied during the design,

construction and demolition phases of a building's life-cycle, it is in the O&M phase that green practices such as recycling and air quality enhancement take place.

Waste reduction

"Grey water" is wastewater from sources such as dishwashing or washing machines and can be used for subsurface irrigation, or if treated, for non-potable purposes, e.g. to flush toilets and wash cars. Rainwater collectors are used for similar purposes. An alternative to costly centralised wastewater treatment processes is converting waste and wastewater into fertiliser. By collecting human waste at the source and running it to a semi-centralised biogas plant with other biological waste, liquid fertiliser can be produced. Practices like these provide soil with organic nutrients and create carbon sinks that remove carbon dioxide from the atmosphere, offsetting greenhouse gas emission. (Lange, Grottker and Otterpohl, 1997).

3.2.3 Identified sub-indicators and screening criteria

Table 7. Sustainable sub-sectors in the construction sector and the environmental screening criteria

Sub-sector	Proposed screening criteria	Justification
Green building	**Private standard:** BERDE (Building for Ecologically Responsible Design Excellence)	The Philippine Green Building Council (PHILGBC) is a non-government organization that has been created for the BERDE formulation and for other green advocacies which establishes green building standards for planning, design, construction, operation or maintenance practices, renovation, expansion and retrofitting of building projects in the country.
	BERDE Rating System v1.0 for New Construction and Existing Buildings	The Green Building Act promoted by PHILGBC is pending approval by Congress.
Energy efficiency measures	**Government standards:** Bureau of Product Standards	Impose energy efficiency standards for room air conditioners, refrigerators, freezers and lamps.
Recycling of materials		Sustainable consumption, resource efficiency, reduction of waste

3.2.4 Estimating environment-related employment

The whole construction industry employed 1.9 million workers in 2011. While the concept of green buildings is still new, it is highly probable that there are many practicing green

construction workers in the industry but it is difficult to extract their numbers since there are no available statistics.

The main challenge in identifying green practitioners in the industry is that the decision to adopt green design, practices and materials are not necessarily made by the architect, engineer, and contractor or construction workers. The owner of the building or any infrastructure makes the decision. Cost is often the main consideration. Although a green building may not necessarily be more expensive, since eco-friendly products at its nascent stage are available only in small quantities, effectively becoming more expensive. Accreditation and licensing of green practitioners are also not yet mandated so it is also possible to have cases where buildings owners want to build a green building but could not find capable architects, engineers or suppliers.

There is a misconception that only buildings made of green materials or those installed with solar panels are green buildings. Or using one or two eco-products would make a building green. Looking back at the list of best practices to achieve energy efficiency and materials utilisation, significant impacts could be achieved by good, functional design. Also, some of the best practices mentioned in there are already commonly incorporated in site construction work or considered at the building design stage especially by big construction companies and design firms complying international standards. The motivation may be not to reduce CO_2 emissions but more of as part of value engineering. In this regard, it is acceptable to assume that companies engaged in construction of high-rise condominiums, commercial buildings, industrial buildings and institutional buildings are already following energy efficiency and resource optimization practices and therefore can be considered as environment friendly practitioners. About 25 per cent of contractors specialized in single detached houses are assumed to be at par. Taking the National Capital Region (NCR) data (131.5468 billion) projected to the overall sector in terms of value (1,184 billion), the resulting ratio (11.11 per cent) is used to estimate environment-related employment which is equal to 211,090 jobs out of 1.9 million jobs.

3.2.5 Decent work

Work in construction sites for manual labourers is tough. Working conditions are gradually improving either by enforcement of labour laws or standards set voluntary by companies. Safety standards are now usually observed in construction sites.

Most of the people working in the construction industry belong to some organization promoting social welfare or higher learning among the group. The Philippine Contractor Association, Inc. for example, is composed of more than 1,500 members nationwide, undertaking 80 per cent of government infrastructure projects. There are also professional organizations for architects, engineers, and other practitioners. Construction workers in urban areas are also members of some organized labour groups. Minimum wage is also followed, at least in urban areas. It can be assumed that about half of the total jobs (1.9 million jobs) are decent or about 950,000 jobs.

3.2.6 Estimating green jobs

Based on the assumptions discussed, the construction sector has an estimated 211,090 green jobs. This figure will be further checked and validated during the FGDs and actual survey.

3.3 Services

In 2011, the largest contribution to the Philippines GDP came from the service sector (54.4 per cent) while employing about half (52.2 per cent) of the workforce.

3.3.1 Focus on the retail sub-sector

About one-third of the service sector is comprised by the retail industry. It accounts for roughly 15 per cent of the country's GNP and employs about 5.25 million people, representing a significant 18 per cent of the country's workforce. Roughly two of every ten workers are employed in the retail industry.[10]

The retail industry is a huge consumer of power, energy, water, plastic and other consumables and involves distributing new and used goods for personal or household consumption. Retail establishments are usually classified according to the goods or items they distribute. The National Statistics Office classified them according to these products:

- books, office and school supplies, publications;
- food, beverage, and tobacco;
- dry goods, textiles and wearing apparel;
- construction materials and supplies;
- office and household furniture, furnishings, and appliances and wares;
- transportation, machinery and equipment, accessories and supplies;
- medical supplies and equipment stores; and
- petroleum and other fuel products.

In terms of employment, the retail sector is known for providing jobs to women, most of who serve as cashiers and salesladies at department stores. Nearly two-thirds of employed individuals in the retail sector are women. About one-fourth of employed women in the country are working in the retail sector.

[10] Philippine Retailers Association, http://www.philretailers.com/index.php?option=com_content&view=article&id=10&Itemid=10 [accessed 15 Apr. 2012].

3.3.2 Key trends towards sustainability

For retailers, going green means operating more efficiently. It is also an opportunity to create a green brand that attracts consumers and fuels growth. According to a 2008 Boston Business Journal report, 87 per cent of consumers are more likely to buy products from a retailer that is committed to environmentally-friendly practices.

Energy consumption of retailers accounts for 35 per cent to 55 per cent of their total operational costs. Tougher competition pressures retailers to further cut operational costs to sustain profitability while keeping products and services affordable and comply with government initiatives to reduce carbon footprint and minimize impact to environment. The Philippine Government launched the National Energy Efficiency and Conservation Program (NEECP) in August 2004 to further strengthen the implementation of energy efficiency and conservation programmes through the promotion of saving and efficient utilisation of energy in the economy in the period 2005–14. The Government's objective was to make energy conservation a way of life for every Filipino through its theme dubbed as "EC Way of Life".

The conduct of energy efficiency and conservation seminars in the commercial, residential and industrial sectors contributed significantly to the dissemination of proven energy efficient technologies available in the market, including service companies and financial institutions that support energy efficiency. However, many small and medium-sized enterprises (SMEs), which constitute 95 per cent of the retail sector, need more help to enhance their capability to practice resource and energy management.

3.3.3 Identified sub-sectors and screening criteria

The following are identified as possible practices within the retail industry to make their operations and employment environmentally sustainable.

Sub-sector	Proposed screening criteria	Justification
Energy efficiency measures	**Government guidelines:** National Energy Efficiency and Conservation Programme **Government guidelines:** Energy Efficient Lighting / Lighting Systems in government facilities	Calls for continuous implementation and expansion of the appliance and equipment energy standards and of building energy usage standards.
Green purchasing	**Government guidelines:**	There are already 25 products that are eco-labelled and issued a Green

	National Ecolabelling Programme (RA 9003)	Choice Philippines seal which is recognised by the Global Eco-labelling Network.
Green products	**Government guidelines:** National Ecolabelling Programme (RA 9003)	There are already 25 products that are eco-labelled and issued a Green Choice Philippines seal which is recognised by the Global Eco-labelling Network.

3.3.4 Estimating environment-related employment

The Philippine Retailers Association has over 300 member companies, covering the gamut of the distribution chain, from retailers, mall and shopping centre operators to traders/suppliers, manufacturers, distributors, and wholesalers, employing about 5.25 million people. Two of the association's objectives are close to supporting sustainable development goals: (i) to encourage members to become socially responsible and contribute towards the country's socio-economic development; and (ii) to make the members aware of how they can help protect the environment.

There are no available statistics on the employment dimension of environment-related activities or practices that retailers implement to reduce energy consumption and optimise resources.

ConservePhil – Energy Efficiency for Retailers in the Philippines assists to ensure that the retail sector has an enhanced access to services that are related to resource and energy management and to help retailers achieve energy efficiency benchmarking international standards and best practices. Their activities include: (i) creating awareness on energy efficiency in two different cities; (ii) provide e-learning toolkits to promote self-implementation of energy efficiency programmes; (iii) development of an online portal; (iv) local capacity building; (v) technical assistance; and (vi) special information campaigns.

3.3.5 Decent work

Job opportunities in the retail industry vary ranging from professional to low-skilled work. The categorization of the decency of work in the retail sector will be discussed at the FGD later on.

3.3.6 Estimating green jobs

Not applicable.

3.4 Tourism

The contribution of tourism to the Philippine economy has remained stable in the last 11 years as shown by data from the National Statistical Coordination Board (NSCB). The share of tourism direct gross value added (TDGVA) to aggregate gross domestic product averaged 5.8 per cent for the years 2000 to 2010. In 2010, the sector's contribution was at 5.8 per cent. In 2010,

TDGVA grew by 13 per cent to PHP518.5 billion. It was higher than the PHP459.0 billion posted in 2009. Domestic tourism expenditures or the total purchase of resident visitors within the country either as a domestic trip or part of an international trip posted a double-digit growth of 15.1 per cent. It was higher than the 2.7 per cent growth in 2009. The economic importance of domestic tourism has grown substantially in recent years. Its economic contribution is substantially more important than that of inbound tourism as domestic expenditures are about six times as much as inbound tourism expenditure. In addition, inbound tourism expenditures or the total purchases of non-resident visitors including foreign visitors and Philippine passport holders permanently residing abroad was valued at PHP109.2 billion, 9.6 per cent higher than the PHP99.7 billion from a year ago.

3.4.1 Importance of the sector and key trends

Tourism is a major jobs generator and is a labour-intensive industry. Today, the travel and tourism industry – with 3.69 million jobs – accounts for 10.2 per cent of jobs in the economy in 2010, as suggested by table 8.

Table 8. Total employment in tourism industries 2005–10

	2005	2006	2007	2008	2009	2010
Total employment in Philippines	32 312	32 962	33 564	34 089	35 060	36 047
Tourism-related Industries	3 136	3 217	3 359	3 415	3 547	3 694
Hotels and similar	98	101	103	109	115	119
Restaurants and similar	763	785	804	845	894	926
Passenger transport	1 339	1 356	1 419	1 415	1 463	1 489
Travel agents, tour operators and tourism guides	142	163	172	177	175	181
Recreation, entertainment and cultural services	258	267	310	309	309	362
Retail trade on tourism-characteristic goods	240	245	248	252	263	276
Miscellaneous	297	300	302	309	328	341
Share of total employment (%)	9.7	9.8	10.0	10.0	10.1	10.2
WTTC estimates	4 955	5 021	5 065	4 717	4 313	4 371
Percentage share (%)	15.3	15.2	15.1	13.8	12.3	12.1

With the completion of the National Tourism Development Plan for 2011 to 2016, the tourism industry anticipates more robust growth, most especially as new policy reforms are implemented and convergence initiatives are firmed-up between the Department of Tourism (DOT) and national government agencies. Anchored on the development of highly competitive but environmentally and socially responsible tourism that promotes inclusive growth, the tourism sector aims to achieve in 2012 a 16 per cent growth in visitor arrivals or 4.6 million inbound tourists and a 4 per cent increase in domestic travellers to 30.2 million that will generate PHP1.2 trillion (US$27 billion) in tourism revenues.

Tourism direct gross value added in 2012 grew by 12 per cent to PHP645.8 billion (US$14.8 billion), creating 400,000 new employment opportunities for Filipinos, especially in the rural areas.

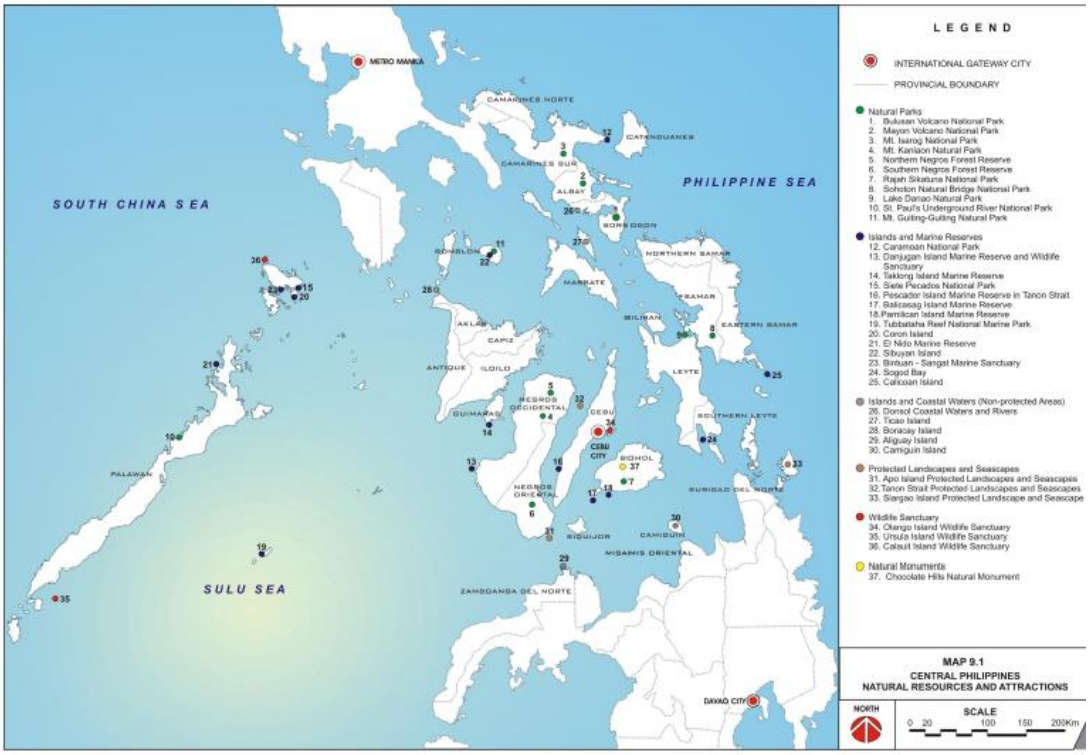
Nature and ecotourism sites form a significant component of tourism in most of the destinations within the Philippines. There is a wide range of nature products which include dolphin watching, birdwatching and mangrove tours. In the development of nature products, ecotourism principles are being consciously applied. The National Ecotourism Strategy (NES) has given impetus to the development of various community-based ecotourism products. Nature and ecotourism sites include the Olango birdwatching tour in Cebu, the Cambuhat River cruise and the Pamilakan Island dolphin watching (Marine Life) tour in Bohol.

3.4.2 Key trends towards sustainability

Ecotourism development in protected areas received further support from the Government with the passage of Executive Order No. 111 (ecotourism development) in 1999. This law mandated the preparation of a National Ecotourism Strategy (NES) to provide an integrated management plan for the development of Ecotourism and was published in 2002. National laws of local application in support of tourism development, including recently passed laws creating tourism zones and supporting institutions, further support the development of ecotourism activities and products. The more pertinent are the strategic environmental plan or SEP law (RA 7611) and the Tourism Zones Declaration laws (RA 9444 and 9445). The SEP law provides for Ecologically Critical Area Network (ECAN) zoning that aims to protect, develop and conserve the natural resources of the province of Palawan. The law defines ECAN zoning as a system of classifying land and aquatic/marine resources in accordance with their important ecological features, vulnerability, present conditions and management requirement. ECAN zoning involves the establishment of a graded system of protection and management covering the whole of Palawan including its tribal lands, forests, mines, agricultural areas, settlement areas, small islands, mangroves, coral reefs, seagrass beds and the surrounding areas. ECAN zoning also includes the provision of areas for tourism and recreation. In effect, the ECAN zones clearly define and delineate areas suitable for ecotourism development. Almost all of the ecotourism destination sites in the Philippines are located within areas declared as Protected Areas (PAs) under the National Integrated Protected Areas System (NIPAS) Act (RA 7586). Implementation of this Act (passed in 1992) is the responsibility of the Protected Areas and Wildlife Bureau (PAWB) under the Department of Environment and Natural Resources (DENR). The law aims to protect

outstanding and biologically important public lands that are habitat to rare and endangered species of plants and animals. It has established different categories of protected areas to include strict nature reserves, national parks, national monuments, wildlife sanctuaries, protected landscapes and seascapes, resource reserves, national biotic areas and other categories established by law, convention or international agreements to which the Philippine Government is a signatory. The Protected Areas and Wildlife Bureau is the policy-making unit for the establishment of protected areas and programmes for biodiversity conservation. It is also the lead unit of DENR for the ecotourism related programmes of the agency.

Figure 12. Location of ecotourism sites in the Philippines



3.4.3 Identified sub-sectors and screening criteria

The following are identified as possible sub-sectors within the tourism sector to provide environmentally sustainable employment.

Sub-sector	Proposed screening criteria	Justification
Eco-tourism	**Government guidelines:** National Ecotourism Certification Programme	Executive Order No. 11 issued on 17 June 1999 established the Guidelines for Ecotourism Development. National Ecotourism Certification Program.

3.4.4 Estimating environment-related employment

There is a huge support from key NGOs to promote ecotourism in the country. Most of them are in the forefront of ecotourism development and promotion. Notable ones are listed below:

- **Philippine Reef and Rainforest Conservation Foundation, Inc. (PRRCFI):** based in Bacolod City, this NGO is the lead organization in the purchase of Danjugan Island in Negros Occidental for conservation. The island is now a major showcase for ecotourism in the area.
- **Negros Forest and Ecological Foundation (NFEFI):** based in Bacolod City, Negros Occidental, this NGO helps organize communities in the Northern Negros Forest Reserve to develop the ecotourism potential in the area. It also maintains a wildlife rescue centre in the city which has become a major educational attraction.
- **Philippine Rural Reconstruction Movement (PRRM):** under its "EcoDev Tour" programme, PRRM has developed nature tours in Ifugao, Marinduque, and Camiguin.
- **Conservation International (CI) – Philippines**: helps in the protection of ecosystems and improving the quality of life of local communities. CI is now involved with ecotourism programmes in Palawan. It also manages the "Adopt a Species" programme.
- **Worldwide Fund for Nature (WWF) – Philippines (Kabang Kalikasan ng Pilipinas):** is an environmental organization committed to reversing the accelerating degradation of the environment. The WWF is involved with ecotourism programmes in Tubbataha, Donsol, Pamilakan Island and Turtle Islands.
- **Haribon Foundation:** works for biodiversity conservation and sustainable resource management. Its mission includes the promotion of community-based management strategies, such as the areas in Mount Isarog (Camarines Sur) and Jetafe (Bohol).
- **Wild Bird Club of the Philippines (WBCP):** although considered as a hobby club, WBCP has been advocating and creating programmes geared towards the appreciation and growth of birdwatching in the Philippines.
- **El Nido Foundation:** is a social development organization that seeks to improve the quality of life in El Nido, while at the same time preserving the area's natural integrity through community-based efforts and partnerships in conservation and sustainable utilization of resources.
- **Coral Cay Conservation, Inc. (CCCI):** is a UK-based organization which undertakes studies of coral reefs and other natural areas in Danjugan Island, Negros Occidental and Sogod Bay, Southern Leyte.
- **Friends of the Flying Fox:** is involved in the protection of forest areas in Aklan and the fruit bats in Boracay Island. It seeks to protect the remaining roosting site of the giant fruit bats in Boracay from the encroachment of development.

There are no available data specifically on ecotourism employment or job creation. Recognising the strong support of environmental NGOs in promoting ecotourism, it may be possible for a very rough estimate assuming at least 5 per cent of hotels, restaurants, tour guides and

recreational services be devoted to ecotourism. This assumption yields 31,760 environment-related jobs. This estimate should be refined and revised after the FGDs and surveys.

3.4.5 Decent work

Jobs in the tourism sector ranges from professional work to seasonal part-time jobs. Its characterization if decent or not will be verified at the focus group discussions and actual surveys.

3.4.6 Estimating green jobs

Not applicable.

3.5 Transport

The transport system serves as a backbone of the economy, as people and businesses depend on a network, either by land, water or air, which provides reliable, safe, fast and efficient services. It contributes to employment generation and it has a crucial role in tourism, since it links people traveling to different destinations. In terms of GVA, in 2008 transportation[11] had a share of 3.1 per cent of the country's GDP, bigger than the share of mining and quarrying (1.7 per cent) and only slightly lower than the share of utilities (electricity, gas and water, 3.2 per cent).

3.5.1 Importance of the sector and key trends

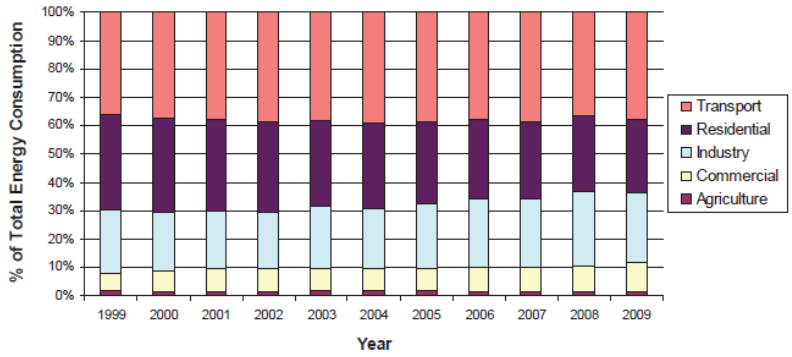
The most widely used mode of transportation in the Philippines is by land contributing more than five times the combined GVA of water and air transportation with a 2.6 per cent share of GDP in 2008. The focus on road transport also take into account its dominance in moving passengers (98 per cent) and freight (58 per cent) in the country.

As of 2009, the estimated total length of roads in the Philippines was 213,351 km, of which 54,481 km are paved and 158,670 km are unpaved. Although traffic congestion is a main challenge in major urban centres, with an estimated 959,400 passenger cars registered nationwide, the rate of motorization (in passenger cars per 1,000 people) is quite low, at ten cars per 1,000 people. Considering all vehicles, there are 6,052,000 registered vehicles, or seven vehicles for every 100 people. Most Filipinos take public transport with as high as 80 per cent in highly urbanized cities. There are currently over 23,000 buses, 36,000 taxis and about 217,000 jeepneys providing public services throughout the country. Meanwhile, there are currently more than 90,000 tricycles in Metro Manila alone based on independent surveys by local government units. Transport consumes more energy than any other sector. In 2009, it accounted for 37.7 per cent of total energy consumption, where road transport typically consumed about 80 per cent of

[11] Transport is usually aggregated with storage and communications in national statistics. Data are from Virola (2009).

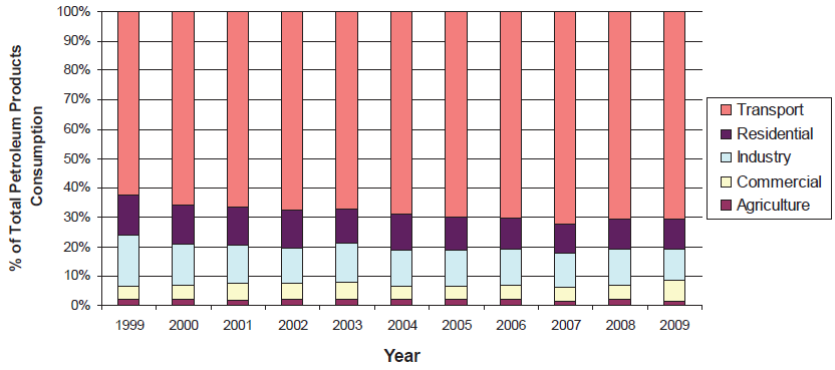
this share of the demand as shown in figure 9. Of the total energy demand, it was estimated that the transport sector accounted for over 70 per cent of the country's petroleum products consumption as shown in figure 13. The transport sector emitted 32 per cent of total GHGs in 2005 was estimated at 29.3 $MtCO_2$ in 2007, of which road transport contributed about 24 millions of tonnes of carbon dioxide ($MtCO_2$), while maritime and aviation emitted a total of 5.3 $MtCO_2$.

Figure 13. Historical energy consumption by sector



Source: DOE, 2010.

Figure 14. Historical petroleum product consumption by sector



Source: DOE, 2010.

Based on the current 6 per cent growth rates in motorization and the projected increase in urban population by 35 million by 2030, emission contributions from road transport, estimated at 24 $MtCO_2e$ in 2007, are projected to increase to 37 and 87 $MtCO_2e$ by 2015 and 2030 respectively under a business as usual scenario. This would result in the rapid enlargement of the country's carbon footprint, further exacerbating pollution in urban areas.[12]

[12] National Framework Strategy on Climate Change 2010–22.

Emission from mobile sources has contributed 65 per cent to the air pollution load nationwide, much more than the stationary sources. Mobile sources account for big chunk of particulate matter, carbon monoxide, nitrogen oxides, and volatile organic compounds. The time series data on total suspended particulate matter from 1976–2007 show that the normal level has been exceeded since 1987 in most areas in Metro Manila. While air quality has continued to improve since 2003, as evident in measurements by the DENR, concentrations such as that of TSP continue to be above the acceptable values. The national TSP trend from 2003 to 2007 is still above the Clean Air Act target of 90 μg/Ncm.[13]

Transport infrastructures are particularly vulnerable to adverse weather conditions. In 2009, after the two strong typhoons *Ondoy* and *Pepeng*, damage caused to roads, bridges and other structures was estimated at PHP2.539 billion and PHP281.67 million, respectively. Regions most affected by *Ondoy* were Region III (Central Luzon) with estimated damages to roads and bridges of PHP1.423 billion, followed by Region IV–A (Calabarzon) with estimated damages of PHP784 million and Region V (Bicol) with damages of PHP96 million.[14]

3.5.2 Key trends towards sustainability

The current state of transportation in the Philippines is at a critical stage. Apart from the negative environmental impacts of transportation, the increase in road traffic accidents is another aspect of the unsustainable transport system. The national annual cost of traffic accidents had been estimated to constitute 2.6 per cent of GDP of the Philippines in 2005, equivalent to about PHP105 billion. Also, the cost of traffic congestion in urban areas attributed to lost man-hours, additional fuel consumption, health costs, and lost investment opportunities and translates to about PHP140 billion (about 2 per cent of the country's GDP) lost in 2008 in Metro Manila alone.

In an effort to reduce the country's carbon footprint, improve local air quality, and achieve other transport co-benefits, a low carbon path is essential. The National Framework Strategy on Climate Change considers environmentally sustainable transport as one of its key mitigation targets with objectives to improve the efficiency of the transport sector through increased uptake of alternative fuels and expansion of mass transport systems. This framework promotes models to improve the transport sector's efficiency and modal shifts as compressed natural gas and liquefied petroleum gas (LPG) becomes the primary fuel for public transport, and support the expansion/shift to more efficient mass transport systems such as metro rail transit (MRT), light rail transit (LRT) and bus rapid transit (BRT).

In addition, recognizing that climate change can provide opportunities that would allow the Philippines to capitalize on its greenhouse gases mitigation potential for cleaner, indigenous and optimized energy and transport bases, as well as enhanced sinks, the country can leverage

[13] Department of Energy: *Issues and challenges in the transport Sector: Formulation of a national environmentally sustainable transport strategy for the Philippines*, 2010.

[14] National Disaster Coordinating Council. Situation Report No. 14 regarding Typhoon "Pepeng" (PARMA) TC-2009-00214-PHL, as of 8 Oct. 2009.

recently-passed policies like the Renewable Energy Act and the Biofuels Law, which could address its energy insecurity while providing much-needed co-benefits such as pollution prevention. Similarly, the Philippine Development Plan envisions a "safe, secure, efficient, viable, competitive, dependable, integrated, environmentally sustainable, and people-oriented Philippine transportation system". It proposes to: (i) adopt a long-term national transport policy; (ii) develop strategic transport infrastructure and maintain/manage transport infrastructure assets; (iii) develop an integrated multimodal logistics and transport system; (iv) separate the regulatory and operation functions of transport and other concerned agencies; and (v) comply with safety and security criteria.

3.5.3 Identified sub-sectors and screening criteria

The strategic priorities mentioned in the framework are: (i) promote models to improve the transport sector's efficiency and modal shifts; (ii) convert public utility vehicles to LPG and renewable energy sources, and the expansion of/shift to more efficient mass transport systems; and (iii) integrate climate change to the formulation of energy and transport policies, e.g., formulation of a national environmentally sustainable transport strategy. The proposed sub-sectors and screening criteria are seen in Table 9.

Table 9. Sustainable sub-sectors in the transport sector and the environmental screening criteria

Sub-sector	Proposed screening criteria	Justification
Mass transport systems (LRT, MRT, bus systems)	**Benchmarks:** Reduced CO_2 per output, improved resource efficiency **Government guidelines:** National Environmentally Sustainable Transport (EST) Strategy for the Philippines	Increased sustainability (e.g. reduced emissions, environmental impact) over conventional (fossil fuel) energy production.
Vehicle retro-fitting	**Benchmarks:** Reduced CO_2 per output, improved resource efficiency **Government guidelines:** National EST Strategy	Reduced emissions and higher vehicle mileage
Cleaner fuels	**Benchmarks:** Reduced CO_2 per output, improved resource efficiency **Government guidelines:** National EST Strategy	Shift to CNG, LPG Use of biofuels Reduced emissions
Electric vehicles (e-bus, e-jeepneys,	**Benchmarks:** Reduced CO_2 per output,	Reduced emissions, reduced pollution, and reduction of fossil fuel consumption.

e-trikes)	improved resource efficiency	
Production of 'green vehicles' **(e-bus, e-jeepney, e-trike)**	**Benchmarks:** Reduced CO_2 per output, improved resource efficiency	Reduced emissions, reduced pollution, and reduction of fossil fuel consumption.

3.5.4 Estimating environment-related employment

Estimating the employment share of the transport sector is a challenge as most statistics have aggregated the data with storage and communications. In 2011, the combined sectors accounted for about 7.5 per cent, of total employment which is equivalent to 2,789,325 jobs.

Using data in 2007, there were:

- Private car + sport utility van (SUV): 906,379
- Taxi + Car rental: 37,704
- Private utility vehicle: 1,387,090
- Public utility jeepney (PUJ) + auxiliary utility vehicle (AUV): 215,529
- Private bus: 7,017
- Public utility bus (PUB) + service bus (SB): 23,162
- Truck: 281,261
- Motorcycle: 2,056,320
- Tricycle: 591,254
- **Total: 5,505,696**

There were 6,052,000 million registered vehicles in 2011, a 9 per cent increase from 2007 figures. Referring to 2007 data and applying the 9 per cent growth to arrive at the 2011 total, we consider the following assumptions:

- At least two jobs will be generated by one PUB/SB/truck.[15]
- PUJs and AUVs are used for commercial purposes generating at least one job.
- Taxi and car rentals create at least one job.
- At least 30 per cent of private cars and SUV owners have employed drivers.
- At least 50 per cent of private utility vehicles are used for commercial purposes.
- At least 80 per cent of tricycles/motorcycles are used for commercial purposes.[16]

Based on these assumptions, 2,321,890 jobs were generated in 2011. Note that this is almost close to the combined jobs created by the transport, storage and communications sectors (2,789,325 jobs). Most likely, the jobs generated by tricycle drivers, utility vehicle (jeepneys) drivers and some private household drivers are informal jobs not listed in the national statistics. The discrepancy could be even higher considering that the assumptions are on the lower range. Providers of efficient and environmentally-friendly public transport and freight are considered as

[15] One driver and/or an alternate driver or an assistant who collects payment in case of buses.

[16] Driving a tricycle is common source of livelihood both in urban and rural areas. Tricycles or motorcycles with sidecars are commonly used for short-distance trips not serviced by jeepneys or buses.

environment-related jobs. Albeit the strong anti-smoke belching campaign launched after the Clean Air Act of 1999, emissions from many vehicles do not meet the standards. Enforcement of the anti-smoke belching law is also not strictly enforced in response to the strong lobbying of transport groups that would get disfranchised, especially among jeepneys using second-hand engines fueled with diesel and two-stroke tricycles. For comparison of emission factors per vehicle by fuel type, refer to the table below.

In 2007, there were 12,000 taxis converted to LPG and 20 buses running on CNG.[17] While there is not much reduction in CO_2 emissions in converting to LPG, there is a huge reduction in particulate matter which lessens air pollution and damage to human health. There is much to be desired to consider jeepneys or buses, usually dubbed as 'smoke-belchers', to be environment-friendly on the basis of their emissions alone. However, looking at it from a different perspective, say capacity and fuel use, one jeepney can carry 14 passengers on an average (excluding the driver) and about 50 passengers in a bus. Comparing it to a car that carries five passengers (including the driver); it takes three cars to accommodate passengers of one jeepney or ten cars for bus passengers. The amount of space one jeepney or one bus saves compared to its car equivalent, which is most valuable considering the chronic congestion in Metro Manila, fuel savings, and even emission reductions make it somehow more efficient. But this rationalization does not discount the need to reduce the emissions from jeepneys and buses. With this in mind, it is assumed that 163,439 jobs are environmentally-friendly created by buses, about 50 per cent of jeepneys, and LPG taxis.

3.5.5 Decent work

In the transport sector, decent work exists even in informal sector. Bus drivers are now paid on a regular monthly basis, however, it is not the case yet for taxi, jeepney and tricycle drivers but their average daily income is comparable, if not higher, than the minimum wage. Many belong to some transport groups and have social benefits.

[17] Transport and Traffic Planners Inc. (TTPI): *A strategic approach to climate change in the Philippines: An assessment of low-carbon interventions in the transport and power sectors* (2010), http://siteresources.worldbank.org/INTPHILIPPINES/Resources/PH_Low_Carbon_Transport_and_Power.pdf [accessed 15 May 2012].

Table 10. Number of registered vehicles 2009–11

Vehicles/years	2009	2010	2011
Registered motor vehicles by type	**6 220.4**	**6 634.9**	**6 052.0**
Cars	780.2	808.6	716.7
Sports utility vehicles (SUVs)	222.0	261.2	242.7
Utility vehicles	1 643.9	1 700.8	1 514.1
Trucks	1 311.6	317.9	285.3
Buses	33.0	34.9	28.0
Trailers	28.7	29.3	28.2
Motorcycles and tricycles	3 201.0	3 482.1	3 237.0
Registered motor vehicles by classification	6 220.4	6 634.9	6 052.0
Private	5 216.7	5 631.4	5 150.9
Government	68.2	65.1	57.4
Diplomatic	3.9	3.6	3.1
For hire	931.0	934.2	840.0
Tax exempt	0.6	0.7	0.6

Source: Ministry of Transport.

Assuming that all drivers of registered vehicles for hire are provided benefits and comply with the requirements of decent work, there were 840,000 jobs in 2011. Now assuming only half of the assumed total jobs generated satisfy the decent work criteria, it comes to 1,160,945 jobs.

3.5.6 Estimating green jobs

Based on the rationalization of the total jobs created by the transport sector (2,321,910 jobs), estimating the core environment-related jobs (163,439) and decent jobs (840,000–1,160,945), the estimated green jobs in transport are 163,439 or 7 per cent of total estimated jobs. There is strong potential to increase given the current policy directions.

3.6 Solid waste and wastewater management

The Philippines generates 30,000 tonnes of garbage per day. Each Filipino generates between 0.30 and 0.684 kg of solid waste daily, depending on where this occurs. The National Capital

Region posted the highest waste generation rate of about 0.7 kg per capita per day, while the Autonomous Region in Muslim Mindanao (ARMM) is the lowest with 0.30 kg per capita per day. Total waste generation is 35,154 tonnes per day or 12.83 million tonnes every year. Metro Manila alone produces 8,000 tonnes per day, of which only 70 per cent is collected and for the whole country, only half of the garbage generated is collected. Uncollected garbage ends up mostly in rivers, *esteros* (waterways), and other water bodies, clogging the drainage system and leading to floods and the pollution of major water bodies. The problem of solid waste disposal is most serious in urban centres, particularly Metro Manila, because of the high population density, high consumption rates, and the concentration of packaged goods, and packaging materials, some of which are toxic and non-biodegradable.

Uncontrolled dumping of raw sewage in coastal areas, particularly those that are heavily populated or used by tourists, contributes to dangerous water contamination levels. The lack of point-source and nonpoint-source pollution controls are the main factors that contribute to the degradation of water quality in the Philippines. In Metro Manila, up to 58 per cent of groundwater has been found to be contaminated with coliform.[18]

3.6.1 Importance of the sector and key trends

About 150,000 residents of Metro Manila live near open dump sites. Thousands of waste pickers and scavengers rely on dump sites for their livelihoods.

Over PHP3.54 billion (US$64 million) is spent annually on the collection and disposal of Metro Manila's solid waste, at an average cost of about PHP1,450 (US$26.40) per tonne. Despite this high level of spending, the system requires significant improvement.[19] The waste sector in not just a local problem, it is also a significant contributor to global GHG emissions. In the Philippines' First Communication to the UNFCCC in 2000 based on 1994 data, the waste sector contributed 9 per cent of the country's total emissions and was broken down as follows:

- Solid waste 4,253 ktonnes
- Municipal wastewater 966 ktonnes
- Industrial wastewater 920 ktonnes
- Human sewage 954 ktonnes
- Total 7,094 ktonnes

In terms of Clean Development Mechanism (CDM) mitigation projects implemented in the Philippines, 75 per cent are in the waste and waste management sector. Currently there are 46 registered CDM projects – methane recovery and utilization (4), biogas from animal waste (40), composting and methane avoidance (1) and nitrogen dioxide (NO_2) decomposition (1) projects.

[18] European Commission (EC): *Country Environmental Profile* (2005).

[19] Asian Development Bank: *The garbage book – Solid waste management in Metro Manila* (Manila, Asian Development Bank, 2004), http://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/ADB_garbage-book.pdf [15 May 2012].

3.6.2 Key trends towards sustainability

The Local Government Code of 1991 identified that LGUs have the primary responsibility of planning and implementing solid waste management programmes. Furthermore, the RA 9003: Ecological Solid Waste Management Act provides some guidelines and a timeframe for compliance which LGUs have to adhere to for a systematic approach to waste management. One of the important stipulations of RA 9003 is the conversion of disposal sites to sanitary landfills. In line with RA 9003 or the Ecological Solid Waste Management Act of 2000, technical assistance was provided to 1,325 LGUs for the closure and rehabilitation of open or controlled dumps, while technical assistance for the establishment of sanitary landfills was extended to 236 LGUs. Despite closure orders and technical assistance, there were still 838 open dumpsites and 396 controlled disposable facilities that need to be closed or rehabilitated. Only 338 of 1,610 cities and municipalities (20.9 per cent) have completed their solid waste management plans. In Metro Manila, only eight out of 17 cities and municipalities have complete plans.

LGUs have adopted several strategies for waste management which has also enabled them to reduce GHG emissions. Several LGUs have implemented some methane capture facilities and used some of it for electricity purposes while some considered composting as a way to mitigate GHG emissions. Other LGUs have also implemented recycling programmes and installed some Materials Recovery Facilities (MRF) for recycled materials. Intensive information awareness campaigns are also being implemented on proper waste disposal.

3.6.3 Identified sub-sectors and screening criteria

The following are identified as possible sub-sectors within the solid and wastewater sector to provide environmentally sustainable employment.

Sub-sector	Proposed screening criteria	Justification
Solid waste management and treatment	**Government regulation:** Section 59 of Republic Act No. 9003, "Philippine Ecological Solid Waste Management Act of 2000" **Benchmarks:** Amount of waste diverted from landfill (per cent of total waste, recycling or composting rate)	Set guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, including composting, recycling, re-use, recovery, green charcoal processes, and others, before collection, treatment and disposal in appropriate and environmentally sound solid waste management facilities in accordance with ecologically sustainable development principles.
Waste water management	**Government regulation:** The Philippine Clean Water Act of 2004 Implementing Rules and Regulations (RA 9275)	DENR implements a wastewater charge system in all management areas including the Laguna Lake Region and Regional Industrial Centers through the collection of wastewater charges/fees. Industries whose water effluents are within standards are charged a minimal amount.

3.6.4 Estimating environment-related employment

In 2011 the state of solid waste and wastewater management in the country was assessed in compliance with RA 9003. Only 338 LGUs or 20.9 per cent of the 1,610 cities and municipalities had completed their solid waste management plans. In Metro Manila, only eight out of 17 cities and municipalities (47 per cent) have complete plans. Nationwide, only 7,680 out of 42,000 *barangays* (districts) were covered by MRFs for a compliance rate of 18.28 per cent. In Metro Manila, 685 out of 897 *barangays* were covered by MRFs, or a compliance rate of 76 per cent. Of 1,205 disposal facilities in the country, 1,172 are open and controlled dumpsites, and only 33 are sanitary landfills serving 75 LGUs nationwide, for a compliance rate of only 2.7 per cent. In Metro Manila, there are two disposal facilities. Most Metro Manila LGUs dispose of their residual wastes in sanitary landfills outside the metropolitan area.

From the information above, it is implied that there could be a large informal sector that operates in towns and cities that do not have proper designated dumpsites. For example, in Quezon City, the Linis-Ganda Foundation has been working for more than 20 years strengthening the informal waste sector. Its network includes the Metro Manila Federation of Environmental Multi-Purpose Cooperatives; the federation's 17 individual member multipurpose cooperatives representing the 17 local governments of Metro Manila; 572 junk shops, 2,500 junk shop workers, 1,200 Eco-aides, and 132 drivers.

However, available information is not enough to form an informed assumption on the extent of employment generated by such activities in other areas. Similarly, there is no information on the employment generated by the registered CDM projects.

3.6.5 Decent work

A Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ, German Society for International Cooperation) study entitled 'The economics of the informal sector in solid waste management" includes Quezon City as one of their case study areas and describes how formal and informal workers work together. Informal valorizers and service providers have unpleasant and dangerous working conditions. The autonomy and relative freedom of the activity is sometimes also reported by waste pickers to be a benefit that they recognize and appreciate. The informal waste sector provides more livelihoods (10,105 jobs) than the formal waste sector (5,591 jobs) and they earn slightly below the minimum wage (which is reported to be often not respected by private companies).

The "Quezon model" is a model of organized acceptance of informal activities. First, truck pickers are formal workers who are authorized to pick and valorise materials. In return for this right, they accept a sub-minimum wage salary which lowers city and *barangay* budgets for solid waste. In a similar way, informal junk shops can receive an authorization to function as materials recovery facilities. It was envisioned that there would have been more discussions and deliberations on the how to categorize formal and informal waste pickers.

3.6.6 Estimating green jobs

Not applicable.

3.7 Energy

The development of the energy sector in the Philippines is based on the economy's two-tiered energy agenda for realizing energy self-sufficiency and an efficient and globally competitive energy sector. The Philippine Energy Plan, updated in 2007, outlines the government's two major priorities. The first is to attain a 60 per cent energy self-sufficiency level from 2010 and to maintain this until 2014 (self-sufficiency level thus increased from 56.7 per cent in 2008 to 59.2 per cent in 2009).[20] To achieve this target, it aims to increase oil and gas resources by 20 per cent from 2007 levels, to increase indigenous coal production to meet local demand and to increase renewable energy capacity. The government also aims to increase the use of alternative fuels and to strengthen energy efficiency and conservation programmes. The second priority is to promote a globally competitive energy sector through reforms to the power sector and downstream oil and gas industries.

The plans and programmes of the energy sector are guided by the Energy Reform Agenda's vision: "Energy Access for More", the key priority to mainstream access of the greater majority to reliable energy services and fuel, most importantly, local productivity and countryside development. The reform agenda is outlined on three major pillars and directions:

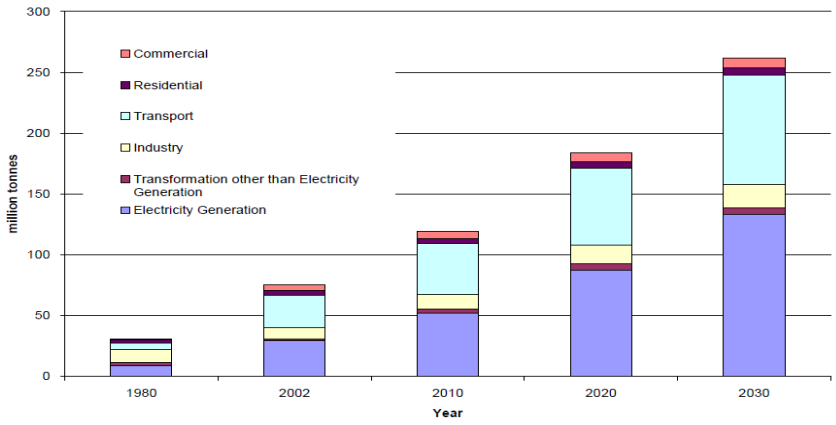
- ensure energy security;
- achieve optimal energy pricing; and
- develop a sustainable energy system.

3.7.1 Importance of the sector and key trends

Figure 16 shows the electricity generation and transport sectors as the biggest sources of emissions in 2002, representing 38.7 per cent and 36 per cent of the total respectively. The Asia Pacific Energy Research Centre forecasts that these trends will continue up to 2030. The increasing emissions from power generation can be attributed to the large component of coal in the projected generation mix.

[20] Self-sufficiency level refers to the use of indigenous energy composed of oil, coal, natural gas, geothermal, hydro, wind, solar, biomass, coco-methyl ester (CME) and ethanol.

Figure 15. CO_2 emissions by sector



Source: APERC, 2006.

Electricity rates in the Philippines are deemed among the highest in Asia. Economic growth has been impeded by an unreliable power supply as indicated in the annual average growth rate of 0.4 per cent of electricity to GDP from 1999 to 2009. Gross power generation in 2009 reached 61,934 gigawatt-hours (GWh), 1.83 per cent higher than the 2008 level of 60,821 GWh. Natural gas-fired power plants remain the top producer of electricity, accounting for 32.11 per cent of the country's total gross generation. Coal-fired plants are second, with 26.60 per cent share of the mix. Oil-based generation only accounted for 8.69 per cent of the total gross generation in 2009.

In mid-2010, the country was again hit by several hours of rotating brown-outs because of a power supply shortage equivalent to 185 MW. The supply deficit was due to the decrease in dependable capacities of hydro plants caused by El Niño and preventive maintenance schedule of some power plants.

The Philippines' indigenous energy reserves are relatively small, with only about 30 million barrels of crude oil, approximately 1,639 billion cubic feet of natural gas and 440,000 tonnes of coal, mainly lignite. However, the Philippines has extensive geothermal resources that could make the economy the world's largest producer and user of geothermal energy for power generation. The Philippines is also endowed with significant hydropower resources, while other renewable energy resources (solar, wind, biomass and ocean) are theoretically estimated to have a power generating potential of more than 250,000 MW. Renewable energy development is targeted with the government gearing to become the world leader in geothermal energy, the largest producer of wind power, and the solar manufacturing hub of South-East Asia.

The Philippines' latest geothermal power plant was inaugurated in April 2012. The Maibarara Geothermal Power Plant, a 20-MW project is the first renewable energy project to see the light of day among the more than 250 RE (renewable energy) contracts signed and awarded in the 2008 Renewable Energy Act. The geothermal power plant, which is a joint venture among several power conglomerates (Philippine National Oil Company-Renewable Corporation, PetroGreen Energy Corp., Trans-Asial Oil and Energy Development Corp.) is mainly managed and owned by the Maibarara Geothermal Inc. (MGI).

3.7.2 Key trends towards sustainability

The goals of reducing fossil fuel consumption and promoting the development and utilisation of renewable energy remain a major challenge. The Renewable Energy Act of 2008 (RA 9513) was enacted to further promote the development, utilisation and commercialisation of renewable energy resources in the Philippines. This Act facilitates the energy sector's transition to a sustainable system with renewable energy as an increasingly prominent, viable and competitive fuel option. The shift from fossil fuel sources to renewable forms of energy is a key strategy for ensuring the success of the transition.

Current initiatives in the pursuit of this policy are directed towards creating a market-based environment conducive to private sector investment and participation and encouraging technology transfer and research and development. The Implementing Rules and Regulations (IRR) were signed on 25 May 2009. Consequently, the National Renewable Energy Board (NREB) was convened pursuant to Section 27 of RA 9513 to promulgate the said law and other related policy and regulatory mechanisms such as the Renewable Portfolio Standard (RPS), Feed-in Tariff (FiT) System and the National Renewable Energy Programme (NREP).

To lessen the dependence on imported petroleum products, government has been continuously promoting the development and utilization of alternative fuels.

The Biofuels Act of 2006 mandates the pre-blending of all liquid fuels for motors and engines sold in the country with locally produced biofuels. Gasoline: five per cent bioethanol by volume within two years of enactment, rising to ten per cent two years thereafter, subject to the determination of its feasibility by the governing body created by the Act, the National Biofuels Board (NBB). Diesel engine fuel: a minimum of one per cent biodiesel by volume within three months of enactment, rising to two per cent two years thereafter, again subject to the NBB's determination of its feasibility and availability of local biodiesel supply.

3.7.3 Identified sub-sectors and screening criteria

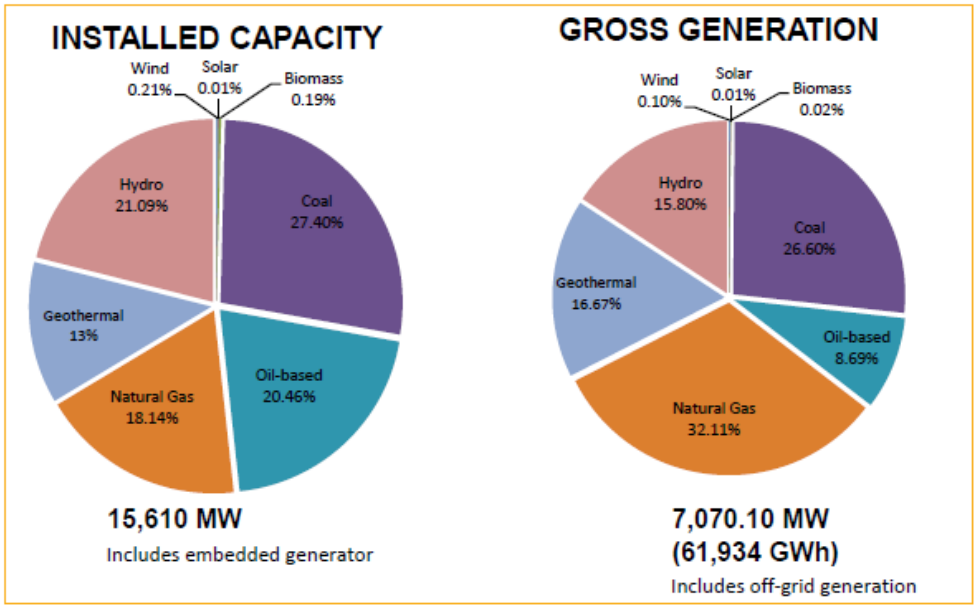
Based from the discussion above, the following are identified as possible sub-sectors within the energy sector to provide environmentally sustainable employment.

Sub-sector	Proposed screening criteria	Justification
Renewable energy	**Government regulation:** Renewable Energy Act (RA 9513) of 2008	Increased sustainability (e.g. reduced emissions, environmental impact) over conventional (fossil fuel) energy production.
	Benchmarks: Reduced CO_2 per output, improved resource efficiency	RA 9513 was enacted to accelerate the exploration and development of renewable energy resources such as biomass, solar, wind, hydro, geothermal, ocean energy sources and hybrid systems.
Sustainable biofuels	**Government regulation:** Biofuels Act (RA 9637)	Increased sustainability (e.g. reduced emissions, environmental impact) over conventional (fossil fuel) energy production.
	Benchmarks: Reduced CO_2 per output, improved resource efficiency	Aims to reduce dependence on imported fuels with due regard to protection of public health, the environment, and natural ecosystem utilizing indigenous renewable and sustainably-sourced clean energy sources.

3.7.4 Estimating environment-related employment

Gross power generation in 2009 reached 61,934 GWh, 1.83 per cent higher than 2008 level of 60,821 GWh. Natural gas-fired power plants remain the top producer of electricity, accounting for 32.11 per cent of the country's total gross generation. Coal-fired plants are second, with 26.60 per cent share of the mix. Oil-based generation only accounted for 8.69 per cent of the total gross generation in 2009.

Figure 16. Philippine capacity and gross generation 2009



Source: National Statistics Office Annual Survey of Philippine Business and Industry.

The share of renewable energy in the gross generation in 2009 was 32.60 per cent. Based on the National Statistics Office Annual Survey of Philippine Business and Industry in 2008, there were 44,796 jobs generated under the generation, collection and distribution of electricity. Assuming the same energy mix in 2008, it can be assumed that 32.6 per cent of jobs generated – 14,604 jobs are environmentally sustainable jobs from renewable energy.

In terms of biofuel promotion, as of the first half of 2010, the Department of Energy had accredited 14 biofuel producers (12 for biodiesel and 2 for bioethanol). The 12 biodiesel producers have a combined production capacity of 395.6 million litres per year. Leyte Agri Corporation, the country's first ethanol facility, and San Carlos Bioenergy Inc., South-East Asia's first dedicated ethanol distillery with an integrated co-generation power plant, have a combined production capacity of around 49 million litres of ethanol annually. By end-2010, Roxol Bioenergy's ethanol plant would have provided an additional capacity of 30 million litres per year, bringing total annual ethanol production to about 79 million litres.

Green Future Innovations Inc. (GFII) is developing a PHP6 billion bioethanol plant and cogeneration project in Isabela. The project will grow sugarcane in 11,000 hectares of idle and underdeveloped land for use as feedstock. It will produce enough bioethanol to displace 54 million litres of imported fossil fuel. To be able to source 700,000 tonnes of sugarcane per year, GFII shall be signing growership contracts with about 4,000 farmer families thus having direct impact on the lives of about 20,000 Filipinos. This is valuable information but not enough to estimate the number of core environmental jobs created in the biofuel sub-sector.

3.7.5 Decent work

In terms of compensation and average weekly hours worked of production workers in the generation, collection and distribution of electricity, which generated 44,790 jobs, with an average monthly compensation of PHP40,989 and an average of 47.8 hours of weekly work, satisfying the decent work criteria.

3.7.6 Estimating green jobs

Based on the discussion above, it can be assumed that there are about 14,604 green jobs in the energy sector. This estimate should be treated with caution and to be further verified during the FGDs and actual surveys.

3.8 Forestry

The United Nations Food and Agriculture Organization (FAO) estimated in 2010 the forest area of the Philippines at 7.66 million hectares, which is 26 per cent of the total land area. The Government of the Philippines estimated the total forest area at 7.17 million hectares (including 737,000 hectares that are outside the "forestlands" category).[21] The estimated contribution of the forest sector to GDP was 1.6 per cent in 1975, 0.14 per cent in 1999, 0.05 per cent in 2003 and 0.7 per cent in 2008. An FAO 2010 estimate put total government revenue from the forest sector in 2005 at PHP136 million, while the estimated total government expenditure in the forest sector was PHP1.98 billion.

In 2006 about 28,000 hectares of forest were formally cleared for agriculture, settlements, infrastructure or other purposes. Unplanned fire destroyed an estimated 9,000 hectares, and drought, storms and pests and diseases reportedly affected about 7,700 hectares of forest. Based on arrests, illegal exploitation was reported to have occurred on about 1,500 hectares of forestland, although this is perhaps more a reflection of the efficacy of forest law enforcement than of the absolute extent of illegal forest activities. Deforestation occurred at an annual rate of about 316,000 hectares in the 1980s, caused by land conversion, shifting cultivation, forest fire and over-logging. According to the FAO (2010), total forest area increased by 274,000 hectares between 2005 and 2010 and by 1.10 million hectares between 1990 and 2010, mainly due to natural regeneration on degraded lands. As of April 2012, no forest area in the Philippines had been independently certified as well managed.

[21] Government of the Philippines: *Report of progress toward achieving sustainable forest management in the Philippines.* Submission to ITTO by the Forest Management Bureau, Department of Environment and Natural Resources, the Philippines (2009).

3.8.1 Importance of the sector and key trends

About 25 million Filipinos live in uplands, half of them occupying forestlands and dependent on them for subsistence uses and traditional and customary lifestyles. Communities occupying 1.6 million hectares of forestlands under tenure are mostly dependent on government assistance and forest-based subsistence activities while awaiting plantation development.

About 1.02 million hectares of natural forests are considered highly vulnerable to climate variability, mostly located in Davao del Sur, Leyte, Sarangani, Sultan Kudarat and Zamboanga del Norte. Natural forests in Leyte are at risk of increased damage from strong winds and excessive rain associated with typhoons. In Mindanao, which is not frequently affected by typhoons, the natural forests are more likely to be affected by drought, although the risk is unknown. Among other things, higher drought frequency and severity can increase the risk of grass, brush and forest fires (Cruz and de Luna, 2009).

Many of the problems associated with the large-scale destruction of forest resources can be linked to a combination of land-tenure and concession-tenure issues and the lack of ability or will to enforce the conditions of the concessions. In order to prevent the loss of old-growth forests, Decree 24/1991 imposed a ban on old-growth (or primary-forest) logging from January 1992 and shifted logging to second-growth (residual) forests. Silvicultural prescriptions were not followed. Today, the control of illegal activities remains a major challenge and is considered one of the main obstacles to sustainable forestry management (SFM). Given a lack of information on forest management at the forest management unit (FMU) level, the extent of SFM is difficult to gauge. Forest management is still evolving towards community based approaches, but there is a lack of policies to support communities in adopting SFM practices, and the effectiveness of current arrangements for co-production is a subject of debate. The total area under management plans is 822,000 hectares (of which about 80 per cent is probably natural forest), a slight decrease over the area reported for 2005 (and less than the 2.25 million hectares reported in FAO 2010).

On the basis of an estimate provided by the Government of Philippines, the FAO reported that 4.05 million hectares of natural forest were under sustainable management in 2005. The Government of the Philippines reported that "all forest areas covered with management plans are considered to be under sustainable management". In general, however, data on the quality of management are lacking. The area of natural forest managed sustainably is estimated by ITTO to be at least 79,000 hectares. The production of industrial roundwood in the Philippines peaked at 11.2 million m^3 in 1974 (FAO, 2001); in 1977 there were 325 sawmills and 70 wood-based panel manufacturing units. Production fell to a low of about 401,000 m^3 in 2001 before recovering to 857,000 m^3 in 2009 (ITTO, 2011). In 2009 the Philippines imported 89,000 m^3 of logs, 165,000 m^3 of sawn wood, 24,000 m^3 of veneer and 111,000 m^3 of plywood.

3.8.2 Key trends towards sustainability

The foundation of forest policy is the Presidential Decree 705 (1975), as amended; it is known as the Revised Forestry Code of the Philippines. According to this Code (Section 2), the components of forest policy are the multiple-use of forests, the systemization of land classification, the establishment of wood-processing plants and the protection, development and rehabilitation of forestlands. The Code was drawn up when the major emphasis was on the large scale commercial harvesting of state-owned natural forests by large corporations. The 1987 Constitution, which reflects a general reorientation of natural resource management policies in favour of co-production, installed community-based forest management as the main framework for forest resource management. Today, communities are the main implementers of SFM strategies and programmes in both planted and natural forests. Nevertheless, a systematic approach to SFM is not yet apparent on the ground.

A major law on a National Integrated Protected Area System (NIPAS), the NIPAS Act, was enacted in 1992 and the Indigenous Peoples' Rights Act was enacted in 1997; both provide overarching directions for forest management. Other relevant laws include the Local Government Code, enacted in 1991, and the Wildlife Conservation and Protection Act of 2001. The Forestry Code and subsequent laws and regulations have not been fully harmonized and updated to reflect this reorientation. A Sustainable Forest Management Bill has been under consideration by the national legislature since 1989 but, to date, has not been passed into law. The bill has seven guiding principles: watershed as the basic forestland management unit; multi-sectoral participation; CBFM; the protection of forestlands and natural resources as a priority concern; reforestation as a priority measure; security of tenure of stakeholders; and professionalism in the forest service (Fourteenth Congress of the Republic of the Philippines, undated). Under Executive Order 606 (27 February 2007) on sustainable upland development, DENR has embarked on a comprehensive upland development programme. The organization's 2009 resources for forest development and management were substantially reconfigured to focus on the restoration of ecosystem services provided by vital watersheds and protected areas while simultaneously catalyzing improvements in upland productivity, creating incomes for upland poor, mitigating hunger among highly vulnerable populations, engaging with organized upland communities, and providing a climate for gainful economic production among poor upland dwellers.

The optimal use of the country's land and its sustainable management, as set out in a national land-use plan, is the key feature of the much-awaited Act on National Land-use Policy. Should the Act pass into law, it would, among other things, identify mechanisms for the allocation of unused and under-used private and alienable and disposable (A&D) lands for tree plantations to augment the limited wood supply from natural secondary forests.

3.8.3 Identified sub-sectors and screening criteria

Based on the discussion above, presented are possible sub-sectors identified within the energy sector to provide environmentally sustainable employment.

Sub-sector	Proposed screening criteria	Justification
Sustainable forest management **(productive forest)**	**Government regulation**: incl. mandatory verification of SFM to mandatory legality standard	A major law on a National Integrated Protected Area System (NIPAS), the NIPAS Act, was enacted in 1992 and the Indigenous Peoples' Rights Act was enacted in 1997; both provide overarching directions for forest management. Other relevant laws include the Local Government Code, enacted in 1991, and the Wildlife Conservation and Protection Act, enacted in 2001. The 1987 Constitution, which reflects a general reorientation of natural resource management policies in favour of co-production, installed community-based forest management (CBFM) as the main framework for forest resource management. Today, communities are the main implementers of SFM strategies and programmes in both planted and natural forests.
	Private standard: Forest Steward Council certification	
Sustainable forest management **(protected forest)**	**Benchmarks:** Management plan	Presence of a management plan should ensure the sustainable management of the protected area, including reducing the environmental impacts of associated activities.
Forest protection services including forest fire prevention	**Benchmarks:** Employed by government	Professionally qualified people supporting forestry management. Trained forest workers
Sustainable collection, harvesting and cultivation of rattan	**Government regulation:** DENR AO No.04	DENR Administrative Order No. 04 Series of 1989 prescribed the computation of sustainable annual allowable cut (AAC) for rattan cutting permits. To ensure sustainability, rattan licensees are required to replant.

3.8.4 Estimating environment-related employment

An estimated 21,000 people are employed in the forest products industry (excluding furniture making), of which about 17,000 are male and 4,000 are female. About 630 people are employed in direct forest operations under timber license agreements (TLAs) or integrated forestry management agreements (IFMAs). The government sector employs about 22,500 professionally qualified people supporting forestry and about 900 trained forest workers. The

FAO (2010) estimated that about 910 people were employed in protected-area management in 2005.[22]

3.8.5 Decent work

As there is no information on decent work indicators in the forest sector, it is assumed that government hired forestry professionals and trained forest workers have decent jobs while half of those employed in the forest products industry and employed in direct forest operations under TLAs or IFMAs can also be considered as having decent employment. The assumed combined total of decent jobs is 35,125.

3.8.6 Estimating green jobs

Taking into consideration the assumptions above, it can be said there are about 35,125 green jobs in the forestry sector. Given the assumptions taken, this will be further verified during the focus group discussions and actual survey.

3.9 Fisheries

The Philippine fisheries industry comprises marine fisheries, inland fisheries, and aquaculture. Marine fisheries can be further divided into municipal fisheries and commercial fisheries. Recreational fisheries have not developed in the country. In 2011, the total volume of fisheries production was 3.47 per cent lower than last year's record. Commercial fisheries posted the biggest output decrease at 16.29 per cent. In municipal fisheries, production went down by 2.84 per cent. Aquaculture, as the only gainer, experienced a 2.44 per cent increase in output. The productivity of municipal fisheries, such as small-scale capture fisheries (less than 3 gross tonne boats), has been declining. This can be partly attributed to overfishing and poor enforcement of fishery laws. The national stock assessment of the Bureau of Fisheries and Aquatic Resources (BFAR) suggests that two-thirds of the 12 major fishing bays in the country are already overfished.

Aquaculture has already contributed a lot to the Philippine fish supply and to the economy in general. However, pressures to maximize use of resources as rapidly as possible, weak institutional arrangements, and prevailing power structures have led to some unsustainable aquaculture developments resembling gold rushes. These can have severe and lasting adverse impacts on the environment and on the poor. Philippine aquaculture has yet to make adequate moves towards responsible aquaculture practices, as guided by the *Code of Conduct of Responsible Fisheries* (CCRF) of the Food and Agriculture Organization and needs to define and to implement best aquaculture practices. The intent of existing aquaculture legislation in the

[22] J. Blaser, A. Sarre, D. Poore, and S. Johnson: *Status of Tropical Forest Management 2011*. ITTO Technical Series No 38. (Yokohama, International Tropical Timber Organization, 2011), http://www.itto.int/news_releases/id=2663 [15 May 2012].

Philippines is good, but many regulations are not known to farmers or, where known, are widely perceived as top-down, restrictive, and irrelevant to their circumstances and are often ignored with impunity.[23]

3.9.1 Importance of the sector and key trends

Between 2004 and 2010, the agriculture and fisheries sector exports rose from US$2.5 billion to US$4.1 billion. The country recorded a favourable trade balance in some items, including fishery products (US$497 million). The fisheries industry employed 3.9 per cent of the total employment, or about 1,450,000 persons in 2011.

Municipal fishermen are considered the "poorest among the poor". In 2000, households whose heads were fishers had a significantly higher poverty incidence than households in general. Their daily income was roughly the retail value of 2 kg of fish. Low incomes can be attributed to declining fish catch, estimated to be about 2 kg per day, down from the 20 kg per day that was the average catch during the 1970s. Households of fishers and those in the fishing industry also had heads with relatively lower education levels compared with households in general. Fishers' households had lower access rates to basic necessities like safe water, sanitary toilets and electricity than other households, and were more likely to live in makeshift houses or were squatting. Also, the average size of households and of those in the fishing industry was greater than the national average (Israel, 2004).

3.9.2 Key trends towards sustainability

In February 1998, the Philippine Fisheries Code (Republic Act 8550) was signed into law. The Code consolidates all laws pertaining to the fisheries sector and repeals or modifies previous statutes that are inconsistent with it. It declares as a state policy that achieving food security is the main consideration in the development, management, and conservation of fisheries and aquatic resources. Its provisions reflect a strong adherence to long-term sustainability, fully recognizing its multiple dimensions and complex elements in the fisheries context through several prohibitive and regulatory measures seeking to balance protection with reasonable and responsible use (Ingles, 2004b).

Earlier, in 1991, the Local Government Code devolved authority over the management of municipal waters to local government units within the parameters set by national fisheries legislation and policies. The establishment of Fisheries and Aquatic Resources Management Councils (FARMCs) at the national, provincial and municipal levels has established a legal commitment by the government to involve stakeholders in the development and management of the fisheries industry.

The Government of the Philippines' most significant policy shift in the past decade has been the introduction of joint management mechanisms of the fisheries sector, involving both the central

[23] WorldFish Center and PRIMEX, Inc. Philippines: *Strategy for Sustainable Aquaculture Development for Poverty Reduction Project, Philippines* (ADTA 4708-PHI). Final report submitted to the Asian Development Bank. (Penang, WorldFish Center, 2007).

government and the municipalities, and the government and the fishers (through the FARMCs). The Philippine Community-Based Coastal Resource Management (CB-CRM) programme has been very successful at awareness raising, with notable pockets of success in implementation. The Philippines has been a leader in devolution of authority for coastal resource management through the LGC and has thus become an example for such actions. However, the challenges of managing fisheries resources in a sustainable manner still remain in most areas. The Code of Practice for Aquaculture, Fisheries Administrative Order No. 214 of 2001, established the general principles and guidelines for environmentally sound design and operation to promote the sustainable development of the industry. The Code deals with many issues including site selection and evaluation, farm design and construction, EIS, water usage, water discharge and sludge/effluent management, use of drugs, chemicals, potentially toxic pesticides and fertilizers, stock selection/stocking practices, introduction of exotic species, genetically modified organisms (GMOs), feed use and management, fish health management, aquaculture data management and incentives.

3.9.3 Identified sub-sectors and screening criteria

Sustainable fishing in aquaculture, with details below, is identified as a possible sub-sector within the fishery sector to provide environmentally sustainable employment.

Sub-sector	Proposed screening criteria	Justification
Sustainable fishing in aquaculture	**Government guidelines:** Code of Practice for Aquaculture	Fisheries Administrative Order No. 214 (2001) establishing the general principles and guidelines for environmentally sound design and operation to promote the sustainable development of the industry. The Code deals with many of issues including site selection/evaluation, farm design and construction, EIS, water usage, water discharge and sludge/effluent management, use of drugs, chemicals, potentially toxic pesticides and fertilizers, stock selection/stocking practices, introduction of exotic species/GMOs, feed, feed use and management, fish health management, aquaculture data management and incentives.

3.9.4 Estimating environment-related employment

Aquaculture in the Philippines has a long history and involves many species and farming practices in diverse ecosystems. Most of the production comes from the farming of seaweed, milkfish, tilapia, shrimp, carp, oyster and mussels. Aquaculture contributes significantly to the country's food security, employment and foreign exchange earnings and is growing much faster than capture fisheries. According to the 2002 Census of Fisheries of the National Statistics Office, there was a total of 226,195 aquaculture operators working in: fishpond operations (126,894), seaweed farming (73,549), fish pen operations (5,325), oyster farming (3,041), mussel farming (2,422) and others (14,964). Seaweed industry leaders estimate that almost 180,000 families are directly dependent on seaweed faming. There are no available data on gender and employment in the aquaculture sector, but women are an integral part of production and post-

harvest activities. The various grow-out and hatchery systems require skilled labour and technical personnel. There are important links with the various sectors supplying the inputs: fry/fingerling production and trade, fertilizer and chemical supply, supply of construction materials and feed ingredients, and feed manufacture, transport and storage. Many people work in the associated sectors: post-harvest processing, transport and storage, marketing and financing. Highly trained staffs are involved in research, development and extension. The few studies available on some farming systems give some kind of picture of the human resources in aquaculture.[24]

The future growth of Philippine aquaculture may not be sustained unless new markets are developed, market competitiveness is strengthened and farming risks are reduced. There are no current disaggregate data to use as a basis for estimation. Just to have an indication of possible environment-related jobs from the fisheries sector, data from 2002 above are used. Assuming the same trend today and that at least half of aquaculture operators which employ at least one paid employee follow sustainable practices, this would generate a very rough estimate of about 113,096 jobs.

3.9.5 Decent work

Based on the above description on the skills required to work in the aquaculture industry, it is assumed that those complying with sustainable practices also follow decent work standards.

3.9.6 Estimating green jobs

Taking into consideration the assumptions above, it can be said there are about 113,096 green jobs in the fishery sector.

3.10 Manufacturing

The Philippine economy over the past years has been characterised by a reduced share of the manufacturing sector in the country's overall GDP and a declining gross domestic investment rate. The country continues to lag behind its neighbours in terms of foreign direct investments (FDI). The *Arangkada Philippines 2010* report noted that inflows of FDI into the Philippines were lowest among six ASEAN countries, and that "many multinational firms not already present in the Philippines bypassed the country".[25] Of the PHP542.6 billion worth of investment pledges of both foreigners and Filipinos in 2010, 39.7 per cent or PHP215.2 billion are intended for projects in manufacturing.

[24] Food and Agriculture Organization: *National Aquaculture Overview – Philippines*, (n.d.), http://www.fao.org/fishery/countrysector/naso_philippines/en [accessed 15 Apr. 2012].

[25] The same report notes that in the period 1970–2009, Indonesia, Malaysia, and Thailand each received twice or three times as much FDI as the Philippines and that only 4.5 per cent of total FDI in six ASEAN countries came to the country.

In 2011, the manufacturing sector employed 3,086,853 persons. The manufacturing industry accounted for the largest proportion (22.1 per cent or 5,253) of the total 23,723 non-agricultural establishments employing 20 or more workers in June 2010.

3.10.1 Key trends towards sustainability

The Department of Energy (DOE) is mandated to provide adequate, reliable and affordable energy to industries to enable them to provide continuous employment and low cost goods and services, and to the ordinary citizen to enable them to achieve a decent lifestyle. Energy should not only be produced and used in a manner that will promote sustainable development and utilization of the country's natural resources but at the same time contribute to the country's overall economic competitiveness and minimize negative environmental impacts.

The DOE launched the National Energy Efficiency and Conservation Programme (NEECP) as part of the SWITCH movement, in July 2008. The NEECP provides the framework for the government's efforts to promote the efficient and judicious use of energy. The ongoing implementation of its energy efficiency and conservation programme will generate average annual energy savings of 17.7 million barrels of fuel oil equivalent or MMBFOE (2.9 million tonnes of oil equivalent or Mtoe) across the planning period 2007–14. Savings are expected to be 7.5 MMBFOE (1.08 Mtoe) in 2010 and up to 9.1 MMBFOE (1.31 Mtoe) by 2014. Other projects and activities under NEECP include:

- **IEC Campaign** – DOE conducts seminar-workshops for target participants in the commercial, residential, industrial and government buildings; fuel economy runs for road transport vehicles; and the use of media to reach wider target sectors.
- **Voluntary Agreements Program** – The government promotes carless days, carpooling and anti-idling campaigns.
- **Energy Efficiency Standards and Labeling Program** – This has discouraged the manufacture or importation of inefficient household appliances and lighting products in the market and resulted in improved quality of locally-manufactured products.
- **Government Energy Management Program** – Government buildings are monitored and subjected to energy audits; seminars on energy efficiency and conservation for government employees.
- **Systems Loss Reduction Program** – This enables private utilities to decrease their systems losses through redesigning transmission lines, improvement of substation equipment and strict monitoring against electricity pilferers.
- **Recognition Programs** – The Don Emilio Abello Award is given to private companies that make significant improvements in their energy consumption patterns.
- **Energy Audit** – The DOE offers energy audits to manufacturing plants, commercial buildings and other energy-intensive companies to evaluate the energy efficiencies of equipment, processes and operations, and recommend energy efficiency and conservation measures.
- **Philippine Efficient Lighting Market Transformation Project** – This addresses the barriers to the widespread use of energy efficient lighting systems in the country. The

objective is to generate energy savings from the change-over, and therewith contribute to the reduction of GHG emissions.

The quantification of savings derived from the various energy efficiency measures and activities undertaken by end-use consumers is the subject of an ongoing study by the government, which seeks to formulate a more effective monitoring mechanism of energy savings. To strengthen the implementation and monitoring of new and existing energy efficiency programmes with government agencies, the government adopted and issued a number of legal framework documents. These documents cover the Guidelines for Energy-Conserving Design of Buildings and Utilities; a ban on the importation of inefficient second-hand vehicles; the establishment of an energy efficiency and conservation testing centre to include testing of vehicle engine performance and energy saving gadgets, among others; the energy efficiency fuel mileage labelling of all brand new vehicles; and the inclusion of energy efficiency projects costing at least PHP50.0 million in the Omnibus Incentives Bill.

The energy labelling and efficiency standards programme is expected to contribute the most to energy savings: 6.7 MMBFOE (0.97 Mtoe) in 2010 and 8.1 MMBFOE (1.17 Mtoe) in 2014. To realise this target, the government will: (i) pursue the standardisation of technical specification requirements in the procurement of energy efficient lighting systems and other electrical equipment and devices in government offices (for example, the use of 32-watt instead of 40-watt CFLs (compact fluorescent lamps) and the use of energy-efficient LCD (liquid crystal display) computer monitors); (ii) formulate a benchmark in government buildings (in kilowatt-hours per square metre, subject to the age of building, its usage/function, height/number of floors and floor area, among others), which will serve as a reference in managing energy consumption; and (iii) promote a market-based application under the Demand Reduction Programme in the absence of utility-based demand-side management.

The government is set to pursue the enactment of a law on energy efficiency and conservation. An Energy Efficiency and Conservation Law is a critical measure to economize the energy requirements of growth. The proposed legislation should incorporate policies and measures to develop local energy auditors and energy managers, develop the energy service company (ESCO) industry, encourage the development of energy-efficient technologies and buildings and provide incentives for the effective promotion of efficiency initiatives in the energy market sector.

3.10.2 Identified sub-sectors and screening criteria

The following are identified as possible sub-sectors within the manufacturing sector to provide environmentally sustainable employment.

Sub-sector	Proposed screening criteria	Justification
Energy efficiency measures	**Government guidelines:** National Energy Efficiency and Conservation Programme **Government guidelines:** Energy Efficient Lighting / Lighting Systems in government facilities	Calls for continuous implementation and expansion of the appliance and equipment energy standards and of building energy usage standards.
Green purchasing	**Government guidelines:** National Ecolabelling Programme (RA 9003)	There are already 25 products that are eco-labelled and issued a Green Choice Philippines seal which is recognized by the Global Eco-labelling Network.
Green products	**Government guidelines:** National Ecolabelling Programme (RA 9003)	There are already 25 products that are eco-labelled and issued a Green Choice Philippines seal which is recognized by the Global Eco-labelling Network.

3.10.3 Estimating environment-related employment

To some extent, energy efficiency and conservation practices are already mainstreamed in the manufacturing industry. However, there is no disaggregated information available to see the corresponding employment generated by such initiatives.

3.10.4 Decent work

The Bureau of Labor and Employment Statistics' Labstat updates for February 2012 mentioned that the manufacturing industry accounted for the largest proportion (22.1 per cent or 5,253) of the total 23,723 non-agricultural establishments employing 20 or more workers in June 201.[26] Of these manufacturing establishments, 16.2 per cent or 850 were with unions while only 15.2 per cent or 801 had collective bargaining agreements. Unionized workers were reported at 136,379 or 16.5 per cent of the total paid employees (828,247) in the industry. To help balance work and family responsibilities, employers in manufacturing establishments provided workers with various facilities and programmes as well as other leave arrangements. Likewise, some establishments have resorted to the adoption of flexible work arrangements.

3.10.5 Estimating green jobs

Not applicable.

[26] The Bureau of Labor and Employment Statistics (BLES) in coordination with the DOLE regional offices conducted the 2009/2010 BLES Integrated Survey (BITS) covering 6,780 non-agricultural sample establishments employing 20 or more workers nationwide. The main objective of the survey was to generate integrated data sets on employment of specific groups of workers, occupational shortages and surpluses, balancing work and family responsibilities and working time arrangements, occupational safety and health practices, and occupational injuries and diseases. The series of LABSTAT updates focuses on the survey results on balancing work and family responsibilities and working time arrangements in the establishments.

4. Conclusion and recommendations

This desk research has started the preliminary basis for further mapping research on green jobs in the Philippines. After establishing the general terms of linkages between environment and economy, a list of key economic sectors and industries have been proposed for further characterization of green jobs as well as clustering for the conduct of focus group discussions and the conduct of establishment surveys.

Ten sectors were profiled and a matrix of sub-sector environmental screening indicators was drafted as well as decent work criteria to be able to do a preliminary estimate of green jobs. It should be noted that the estimates are only as good as the data used. As available and reliable data are often scarce, even non-existent in some cases, very rough assumptions have been made to generate indicative estimates. The estimates should be not be viewed as is, or as absolute values, but more as an indication of a possible range of green jobs within the selected sector or industry.

Overall, the validity of the assumptions made hinged on rational scenarios but more data are needed to validate it. The subsequent activities, the FGDs and actual establishment survey, will provide the necessary data to refine and further validate both the indicators used and the resulting green jobs estimates.

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Green jobs mapping study in the Philippines

An overview based on initial desk research

This desk research report is the initial step in mapping existing green jobs in the Philippine labour market, based on available published data from government as well as non-government sources. The mapping study will examine the linkages between the environment and the economy and the implications for the labour market of climate change. The report will contribute to building a common understanding of the linkages between economic, social and environmental policies in the Philippines. It will provide qualitative and quantitative information on the number and types of green jobs in key sectors of the economy with the intention of estimating actual green jobs in existing industries, based on available published data and substantiated by consultations and actual surveys. The final result of this mapping study will establish baseline figures which may be used as a basis to draft appropriate economic and social policies to further promote green jobs.

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