Module 4
Transitioning to a Green Economy in Key Sectors

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Overview of Module 4

Module 4 presents an analysis of three key economic sectors in the Caribbean – energy, agriculture and tourism – and how they can be repositioned to facilitate a green economy. This module examines energy as a cross-cutting issue and identifies areas for development and use of renewable energy as well as increasing energy efficiency in sectors such as transport and manufacturing. The module presents issues and strategies for transitioning to a green economy in agriculture and tourism, examining issues related not only to energy but also to the use of the natural capital upon which they are based.

Module 4 provides some sector-specific examples of general tools and approaches described in Module 2.

Objectives of Module 4

The objectives of Module 4 are to:

- Identify the key issues related to three key economic sectors in the Caribbean
- Discuss enabling conditions required for transitioning to a green economy in these sectors
- Explore sector-specific approaches to move toward a green economy

Energy

Globally, energy use has climbed steadily over the years, as industrial economies have expanded and developing countries have experienced both industrialization and economic growth. There are however, wide disparities both within and between developed and developing countries. The high income countries with about 20 per cent of global population account for about 60 per cent of commercial energy usage.

Almost 80 per cent of energy consumption is derived from fossil fuels. In 2012, oil accounted for 40.7 per cent, natural gas 15.2 per cent, coal 10.1 per cent, biofuels and waste 12.4 per cent and other sources (including geothermal, solar, wind etc.) a mere 3.5 per cent. Electricity accounted for 18.1 per cent energy consumption – most of which was generated from fossil fuels. In 2012, 67.9 per cent of electricity generation was from fossil fuels (40.4% coal, 22.5%, natural gas and 5.0% oil), with 16.1 per cent from (primarily large-scale) hydro, 10.9 per cent from nuclear sources and 5 per cent from other sources(IEA, 2014).

The World Energy Council's 2010 Assessment of countries' energy and climate policies concludes that the energy sector is responsible for 60 per cent of the global GHG emissions and much of regional and urban air pollution.

Much of the interest in green economy in the Caribbean revolves around its implications for the energy sector. Most Caribbean countries clearly want to reduce dependence on fossil fuels through the development of indigenous alternative sources that are more sustainable (with a focus on renewable energy) and the promotion of energy efficiency.

Energy in a Green Economy

Greening the energy sector refers to increasing energy efficiency (on both the supply and demand side) and obtaining a much greater supply of energy services from renewable sources, both of which will lead to reducing greenhouse gas emissions (GHG) and other types of pollution. This will enhance energy security at global, national and local levels.

Greening the sector also aims to end "energy poverty" for the estimated 1.4 billion people who currently lack access to electricity. Also it aims to provide healthier and more sustainable energy sources for the 2.7 billion people who are dependent on traditional biomass for cooking (UNEP, 2011).

Transformation of the energy sector to more sustainable solutions will address climate change concerns as well as economic development and energy access through the deployment of renewable energy and energy efficiency and conservation in the electricity, transportation and other sectors.

The energy sector has a key role to play in all sectors of the economy.

Renewable energy sources (renewables)

Renewable energy sources diversify a country's energy supplies and reduce its dependence on non-renewable fossil fuels which will eventually be depleted. Renewable energy sources are also cleaner than fossil fuels, emitting fewer greenhouse gases and other air pollutants that are responsible for harming human health.

Green transport

Fuel efficiency for public and private vehicles is a critical part of "greening" both the energy and transport sectors. Efforts in the energy sector to move toward green transport also include the use of clean fuels to minimize pollution. Natural gas is an alternate fuel to gasoline and diesel which is being actively explored – for public transport fleets in the short term and for private vehicles in the longer term. Although natural gas is a fossil fuel, it has less of an environmental impact than oil and diesel.

Green buildings

With respect to energy, green buildings involve increased energy conservation and efficiency among government facilities, factories, offices, homes and hotels etc. The ultimate green building (with respect to energy) would be a carbon neutral building that would use no energy from the national power grid.

Sustainable agriculture and forests

Making the most efficient use of non-renewable energy resources is a key element of sustainable agriculture. The development of biofuels such as ethanol and biodiesel – a key strategy to increase the use of renewable energy and increase fuel diversification –

creates new opportunities to diversify the agricultural industry and enhance its social and economic impact. Also, the energy sector is responsible for encouraging a reduction in fuelwood consumption and the accompanying deforestation. The creation of fuelwood forests is another intervention which contributes to reduced removal of natural forests for fuel wood.

Water services

Water obtained from aquifers using electric/petroleum-fueled deep well pumps requires the use of energy. This is of particular concern in the agriculture sector, which uses a large portion of many countries' water (for example, in Jamaica, 75 per cent). Implementing water-conserving irrigation systems will not only result in less water being consumed for agriculture but will also reduce the energy needs of the agriculture sector as well.

Waste management

Energy-from-waste is an effective method of waste management and waste volume reduction with the added benefit of generating clean energy. Potential exists for the development of renewable energy sources which can be exploited from municipal solid waste as well as from wastes generated from agri-business and wastewater treatment. Energy-from-waste can make a significant contribution to achieving renewable energy targets[8] while at the same time, treating waste that cannot otherwise enter a waste minimization or recycling/composting programme. Waste-to-energy processes can reduce the incoming volume of waste by about 90 per cent, thereby reducing the need for land space to create new dumpsites. Furthermore, combusting municipal solid waste rather than depositing it in a dumpsite results in a reduction in greenhouse gas emissions.

Clean technologies

Major industries such as the bauxite/alumina industry can be encouraged to take greater advantage of co-generation potential to supply energy to the national grid.

New technologies also need to be introduced to reduce the energy cost of production to make it internationally competitive. Greater application of combined heat and power (CHP) concept, can enable capture of waste energy, reduce cost and at the same time allow for export of surplus electricity to the national grid.

Overview of the Energy Sector in the Caribbean

All CARICOM Member States depend heavily on fossil fuels to supply their energy demand. Only one country, Trinidad and Tobago, is a major producer and only net exporter of petroleum, petroleum related products and natural gas. In 2005 Suriname exported some amount of crude oil but imported LPG, gasoline and diesel oil.

[8] Countries can decide whether to consider energy-from-waste constitutes a renewable resource. According to the IEA's definition of renewable energy, it does not.

Consumption of petroleum products within CARICOM, totaled 224,000 boepd with Jamaica with the greatest consumption, followed by Trinidad and Tobago and the Bahamas (CARICOM, 2013). Most of the petroleum is in the form of distillate and residual fuel oil, used mainly in power plants for electricity generation. The other major categories of petroleum products consumed in 2008 were motor gasoline and other petroleum products. Electricity consumption increased in all CARICOM Member States over the period 1998 – 2007, except in Haiti where it remained relatively constant.

Energy poverty is not a major concern in the Caribbean where upwards of 90 per cent of citizens have access to electricity in most CARICOM countries. Those communities that lack access can benefit from distributed generation which RE systems can provide more efficiently.

The contribution of renewable energy (RE) in CARICOM is small compared to the vast potential available. Renewable energy contributed about 9 per cent to the total primary energy consumed between 1998 and 2007. However there has been a gradual decline over the subsequent years as the share of renewable energies for electricity generation has declined.

The Caribbean region has significant potential for RE development with solar, wind, geothermal and hydro power being the best options. Belize, Jamaica and Suriname recorded significant increases in renewable energy electricity mainly from hydropower. Wind-powered electricity generation occurs in Jamaica and St. Kitts and Nevis and there is biomass-based energy notably in Belize, Guyana and Suriname. Electricity consumption for heating water in Barbados decreased due to increased penetration in the utilization of solar heating.

Challenges in the Caribbean Energy Sector

Dependence on imported fossil fuels within CARICOM has created significant macro-economic challenges for the fuel importing countries. The value of energy imports compared to total imports in the importing Member States have progressively increased over the years, producing a negative impact on macroeconomic sustainability. Petroleum derivate imports account for between 40 per cent and 60 per cent of total export earnings for countries such as Jamaica and Guyana with a larger industrial base. For the tourism / service oriented Member States such as Belize, Grenada, St. Vincent and the Grenadines and Barbados, petroleum imports range from 13 per cent to 30 per cent of export earnings (CARICOM, 2013).

The electricity generation infrastructure in many Caribbean countries is old and inefficient. System losses range from a low of 6.6 per cent in Barbados (in 2009) to a high of approximately 50 per cent in Haiti. Essentially, these losses signify important resources that are being wasted and serving no useful economic or development purpose.

Opportunities in the Caribbean Energy Sector

The CARICOM Energy Policy, approved in 2013, demonstrates a regional commitment to creating an energy sector that will facilitate the transition toward a green economy. The policy's goal is to access to affordable, adequate, safe and clean energy products

The Goal/Vision of the CARICOM Energy Policy

"Fundamental transformation of the energy sectors of the Member States of the Community through the provision of secure and sustainable supplies of energy in a manner which minimizes energy waste in all sector, to ensure that all CARICOM citizens have access to modern, clean and reliable energy supplies at affordable and stable prices, and to facilitate the growth of internationally competitive Regional industries towards achieving sustainable development of the Community."

necessary for the sustainable development of Member States and presents a set of objectives that addresses all the principal "sustainable energy" issues.

CARICOM Energy Policy Objectives

1. Sustainable and secure energy supplies through diversification of energy sources
2. Accelerated deployment of renewable and clean sources of energy supplies towards increased energy supply diversification and affordability
3. Sustained growth of intra-Community trade in energy
4. Increased energy efficiency and conservation in all sectors, including the transportation sub-sector
5. Establishment and enforcement of labeling and standards for the importation of electrical appliances as well as standards for vehicles importation
6. Increased investment in production, transformation and distribution of viable energy resources
7. Strengthening and enhancement of the human and institutional capacities in the Community energy sector
8. Programmed expansion of electricity generation, transmission, distribution and trade
9. Improved access to affordable energy by the poor and vulnerable
10. Greater use of renewable energy for electricity generation as well as in the transportation, industrial and agricultural sectors
11. Coordinated approach to exploring and establishing an institutional framework for leveraging financing mechanisms for the development of viable energy resources
12. Increased technology transfer and information sharing
13. Established regional and national targets for emissions reduction with corresponding mitigation actions
14. Strategies for maintenance of adequate energy reserves in the event of disasters

15. Strengthened research, development and innovation efforts in energy sector especially in areas of clean and renewable energy sources and technologies

Other regional programmes provide a supporting environment for transformation of the Caribbean energy sector.

- **Energy and Climate Partnership of the Americas** – fosters partnerships across the Americas to achieve low carbon economic growth and development through initiatives that address energy efficiency, renewable energy, cleaner and more efficient use of fossil fuel, energy infrastructure, energy poverty, sustainable forests and land use and adaptation.

- **SIDS DOCK** – a collective institutional assistance mechanism for sustainable economic development of SIDS and help generate financial resources for addressing climate change adaptation; developed jointly by the Caribbean Community Climate Change Centre and the Secretariat of the Pacific Regional Environment Programme for AOSIS and CARICOM Member Countries[9]. Public-private partnerships will be promoted as a means for investments in sustainable energy projects and technology transfers.

- The **Caribbean Sustainable Energy Roadmap and Strategy** (C-SERMS) – a sustainable energy planning, management and implementation framework and communication tool developed under the CARICOM Energy Programme in collaboration with CARICOM member states and other partners. C-SERMS has recommended regional targets for renewable power capacity, energy efficiency, and carbon emissions reductions in the short (2017), medium (2022), and long term (2027), and outlines key strategies for achieving those targets (CARICOM, 2013b).

At the national level, all 15 CARICOM member states have adopted a national energy policy or have a document in advanced stages of development. National policymakers across the region have set domestic targets to promote renewable energy use. Many member states have already taken the lead in developing and implementing domestic policy mechanisms to support an increase in renewable energy and energy efficiency.

At the regional level, policymakers have jointly established net-billing as the appropriate minimum standard for policy support across CARICOM. Despite these important initial steps, sustainable energy development across the region continues to be limited by policy and data gaps, administrative ineffectiveness, and often inefficient and uncoordinated implementation efforts.

[9] As at October 2011, the eight (8) CARICOM Member States participating in SIDS DOCK are: Antigua and Barbuda, the Bahamas, Belize, Dominica, Grenada, Jamaica, Saint Lucia and Suriname. Barbados and St. Vincent and the Grenadines have committed to signing.

Challenges and Opportunities for Renewable Energy in the Caribbean

Challenges for Renewable Energy in the Caribbean

There are a number of challenges to adoption of renewable energy which have led to a relatively slow uptake of RE technology in the Caribbean. These barriers include the following:

- absence of legislation, regulatory institutions and instruments
- lack of consistent and coherent policies
- inadequate financing/high levels of public sector indebtedness
- high initial capital costs
- inadequate access to land
- technical limitations (for example, 30 per cent generation limits), related to grid absorption capacity
- economy of scale limitations
- high transaction costs
- limited R&D resources
- inadequate availability of skills

International Energy Agency Definition of Renewable Energy

Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly or indirectly from the sun, or from heat generated deep within the earth. Included in the definition is energy generated from solar, wind, biomass, geothermal, hydropower and ocean resources, and biofuels and hydrogen derived from renewable resources.

Note that renewable energy technologies are not without negative impacts and careful planning to address possible environmental and social impacts are essential. Potential issues include the following:

- Production of biofuels can have negative impacts on biodiversity and ecosystems, due to land-use changes and agricultural production practices. This has led to the development of biofuel sustainability standards.
- The environmental and social impacts of large-scale hydropower are significant. The World Commission on Dams has provided guidelines for reducing possible negative impacts of hydropower development. However, in many cases, only small-scale or low-impact hydro solutions are considered to be sustainable energy solutions.
- Increased mining activity and deforestation could result from increased use of renewable energy sources requiring rare earth elements.

Opportunities for Renewable Energy in the Caribbean

Many opportunities exist for the development of renewable energy in the Caribbean.

Recent trends in renewable energy investment

During the past 10 years the growth of investment in renewable energy has been rapid. From 2004 to 2010, total investments into renewable energy exhibited a compound annual growth rate of 36 per cent due to the following reasons:

- The relatively easy access to capital for project developers and technology manufacturers in the developed world and major emerging economies and low interest rates supported the growth of renewable energy technologies
- For some renewable energy technologies, technological developments have led to a significant decline in costs and increased reliability of the technology, which have made investments more attractive
- High oil prices contributed to the interest in renewable energy investments
- Regulatory support for renewable energy technologies increased over the past 10 years

Technical advances and cost competitiveness

As renewable energy technologies have matured their costs have reduced, making many of them increasingly competitive with other energy technologies. Table 2 shows the relative maturity of RE technologies which can be correlated with the cost for implementing this technology.

Table 2: State of Maturity of Renewable Energy Technologies

RE Technology	State of Maturity
Hydropower	The most mature technology
Sustainable biomass applications	Production of sugarcane bioethanol-based transport fuels in Brazil is a commercially mature technology
Wind	Onshore applications of wind energy are also commercially mature, while offshore wind energy is in the diffusion phase and, in some situations, approaching the commercially mature phase
Low temperature solar thermal	Solar energy technologies for heating purposes are commercially mature
Solar photovoltaic (PV)	Solar PV for electricity in small-scale applications is approaching commercial maturity, such as solar roof-top home systems or solar lanterns in off-grid areas, but is generally still dependent on subsidies or price support mechanisms
Geothermal energy	Geothermal energy is harnessed for heat and power generation. It is mature in many countries.

Enabling Conditions for Renewable Energy in a Green Economy

The further development of renewable energy will require a supportive policy environment and enabling conditions that will help level the playing field between fossil fuels and renewable energy sources.

Policy commitment to renewable energy

An enabling policy framework for renewable energy includes clear commitments to long-term development of the sector. Such commitment can be manifested by targets for investment in additional capacity and penetration rates within the energy mix. When supported by other enabling policies, setting targets to achieve these goals can send a strong signal to potential investors. As noted above, all 15 CARICOM countries have national energy policies or are on their way to doing so. The challenge is to ensure policy coherence so that other policies, for example for transportation and tourism, complement these energy policies.

Mitigating risks and increasing returns

As is the case in other sectors, the nature of risks, relative to expected returns, influences the incentive to invest in renewable energy. Risks include:

- Technical and project-specific risks, including risks associated with lead times, construction costs, novelty of the technology, fuel and resources, and operations and management
- Country-specific institutional risks such as stability of the government, reliability of the legal system, transparency of business dealings, currency risks
- Political risk and regulatory risks, such as unexpected changes in policy or uncertainty about the future direction of policy
- Business and market risks, including: financial risks relating to the capital structure of the project such as high upfront capital intensity and the project's ability to generate enough cash flow; economic risks relating to interest rates, exchange rates, inflation, commodity prices, counterparty credit risk; and market risks associated with, for example, future electricity and carbon prices

Various government initiatives, including regulatory policies, fiscal incentives and public financing mechanisms, can reduce many of these risks and thus increase expected returns.

Such measures include:

- offering long-term policy commitment to increased deployment of renewable energy investment
- government-sponsored initiatives to share risks, for example, through loan guarantees or public participation in the project or related infrastructure investments
- action to improve permitting procedures, or grid connection procedures in the case of power generation projects

Module 2 discussed other government initiatives that can provide an enabling environment for movement toward a green economy. These can be applied to the RE sector.

Electricity infrastructure and regulations

The increased use of renewable energy in power generation faces specific barriers due to the demands it makes on existing electricity infrastructure. Electricity generation by wind and solar PV adds variability and lower predictability to the power system, requiring more attention to the design and regulation of energy systems and markets. More reserve capacity, storage or increased trade between countries in the region is needed to provide the necessary flexibility to match demand with variability in supply. Smart grids with variable cost pricing and micro-metering can provide increased demand flexibility and enhance energy efficiency.

Government authorities have to be alert to signals from the renewable energy sector and address market entry barriers that may stem from incumbent industries. In some situations, vested interests and control of access to the grid by incumbent power companies can pose barriers for independent providers of power from renewable sources. Similarly, oil companies may impede the distribution of biofuels through networks that they control. The construction sector may be reluctant to integrate renewable cooling technology in their practices and building codes.

Sustainability standards

As discussed above, renewable energy is not synonymous with sustainability and certain renewable technologies can have significant negative impacts. Governments must establish and follow renewable energy technology standards that protect environmental and social goals. Any standards should balance stringency and flexibility. Overly rigid standards would be a disincentive for producers to enter the market and may limit investment.

Agriculture

Agricultural development is considered as an essential element of the green economy. It has been acknowledged that the development of the agriculture sector using the principles of a green economy will contribute to improved nutrition and health, enhanced food security, reduced dependence on food imports, creation of rural jobs, reduced pressure on the environment – including reductions in GHG emissions – and overall economic and social welfare.

Agriculture also has tremendous potential to alleviate poverty. On average, the contribution of agriculture to raising the incomes of the poorest is estimated to be at least 2.5 times higher than that of non-agriculture sectors in developing countries.

Defining Green Agriculture

The greening of agriculture refers to the increasing use of farming practices and technologies that simultaneously:

- maintain and increase farm productivity and profitability while ensuring the provision of food and ecosystem services on a sustainable basis
- reduce negative externalities and gradually lead to positive ones
- rebuild ecological resources (i.e. soil, water, air and biodiversity natural capital assets) by reducing pollution and using resources more efficiently

Farming practices and technologies that are instrumental in greening agriculture include:

- restoring and enhancing soil fertility through the increased use of naturally and sustainably produced nutrient inputs; diversified crop rotations; and livestock and crop integration

- reducing soil erosion and improving the efficiency of water use by applying minimum tillage and cover crop cultivation techniques
- reducing chemical pesticide and herbicide use by implementing integrated and other environmental friendly biological pest and weed management practices
- reducing food spoilage and loss by expanding the use of post-harvest storage and processing facilities.

The greening of agriculture does not rule out technologies or practices on ideological grounds. If a technology works to improve productivity for farmers, and does not cause undue harm to society and the environment, then it is acceptable. Although natural methods of pest and weed management and organic sources of fertilizer and seed are at one end of a green agriculture spectrum, the highly efficient and precise use of inorganic fertilizers, pest controls and technological solutions may also be included in the broad spectrum of sustainable farming practices.

Overview of the Agriculture Sector in the Caribbean

Agriculture is an important sector in most CARICOM countries despite the economic diversification which has taken place over the last four decades, with the growth of service industries, notably tourism and financial services.

The agriculture sector contributed an average of 3.6 per cent gross domestic product (GDP) in 2006 across CARICOM countries – ranging from a high of 29.6 per cent in Guyana and 17.2 per cent in Dominica to a low of 1.3 per cent in Montserrat and 0.4 per cent in Trinidad and Tobago (see Table 3) (CARICOM, 2006).

The sector's economic contribution to GDP is enhanced when the GDP of agro-industries is included. For example, in Trinidad and Tobago, the percentage GDP share of primary agriculture plus agro-food industries was approximately 8 per cent compared with only 0.4 per cent for primary agriculture alone.

Table 3: Contribution of Agriculture to GDP (2000 constant prices)

Country	% GDP
Antigua & Barbuda	3.0
The Bahamas	2.0
Barbados	3.0
Belize	12.0
Dominica	17.2
Grenada	5.6
Guyana	29.6
Jamaica	5.7
Montserrat	1.3
St. Kitts & Nevis	2.2
Saint Lucia	3.3
St. Vincent & the Grenadines	8.2
Suriname	9.9
Trinidad & Tobago	0.4

Source: CARICOM Secretariat, 2006

Although agriculture cannot be regarded as a predominant sector on the basis of its GDP contribution, it is a significant absorber of the total employed labour force in the Caribbean: 3.3 million agricultural workers or 32 per cent for 15 countries including Haiti, or 1.1 million agricultural workers or 17 per cent of the employed labour force if Haiti is excluded (CARICOM, 2008). Furthermore, the agriculture sector makes an important contribution to rural development in the region.

Traditionally, agricultural commodities such as bananas, sugar, rice, cigars and citrus have been among the main exports. Agricultural exports exceeded 60 per cent of total merchandise exports in the 2001-2003 period in Belize, the Dominican Republic, Saint Lucia and St. Vincent and the Grenadines. The agricultural export proportion was between 20 per cent and 40 per cent in Barbados, Dominica, Grenada and Jamaica. Only in Antigua and Barbuda and in the Bahamas were agricultural exports less than 5 per cent of total merchandise exports.

The overwhelming majority of farms in the Caribbean (84 per cent average for the Caribbean) are small farms (defined as less than 4 hectares) (CARICOM, 2008). Small farms are too small to realize the economies of scale required for increased farming efficiency and small farmers often have to deal with issues such as high cost of purchased inputs (for example, chemical fertilizers, pesticides and seeds), insecure land tenure, inability to secure loans and inadequate road transportation to large urban market centres.

Challenges and Opportunities for Agriculture in a Green Economy

Challenges in the Caribbean Agriculture Sector

The agricultural sector in most Caribbean countries has declined in recent years, primarily because of the contraction in traditional exports. Sugar, bananas, cocoa and rice have experienced price volatility in commodity markets and suffered from the erosion of European Union trade preferences (ILO, 2006). Declining output levels have resulted in declining employment in the sector, negatively affecting rural development.

Challenges in the agriculture sector include:

- Labour shortages, both with regard to unskilled and skilled labour
- Limited access to land due to patterns of land ownership and land tenure
- Competing demands for land by other sectors such as housing and tourism
- Poor land and soil quality due to poor management and utilization of the natural environment
- Outdated and inefficient health and food safety systems
- Inadequate transportation systems, particularly for perishables
- Weak marketing systems, linkages and participation in growth markets
- Limited financing and inadequate new investments
- Weak national statistical systems that affect the collection of agricultural statistics
- Vulnerability to natural hazards such as floods and hurricanes
- Praedial larceny

Opportunities for the Caribbean Agriculture Sector

Many opportunities exist for promoting green agriculture. They include increased awareness by governments, donor interest in supporting agriculture development in low income countries, growing interest of private investors in sustainable agriculture and increasing consumer demand for sustainably produced food.

Government awareness

Governments have become increasingly aware of the need to promote more environmentally sustainable agriculture. Due to new government policies that have emphasized green agriculture, the proportion of global arable land dedicated to organic crops has increased from a negligible amount in 1990 to around to 2 per cent in 2010, and as much as 6 per cent in some countries. The extent of soil erosion and the intensity of air pollution have fallen; the amount of land assigned to agriculture has decreased even as production has increased, and there have been improvements in the efficiency of input use (fertilizers, pesticides, energy, and water) since 1990. However, subsidies for farm-fuel have continued to be a disincentive to greater energy efficiency (UNEP, 2011).

The "Jagdeo Initiative" was a key Caribbean effort, led by President Bharrat Jagdeo of Guyana, to develop a framework for repositioning agriculture in the region. The framework identified some of the constraints and challenges in the agriculture sector in the Caribbean and to develop some interventions to address those challenges. This initiative could be used as a vehicle for regional movement to position agriculture within the movement toward a green economy.

Donor support for agriculture development

After a steady decline over that past 30 years, agriculture-related development assistance began to pick up in 2006 as the current food crisis escalated. In 2009, at the G8 summit in Italy, wealthy nations pledged US$ 20 billion for developing-country agriculture. However, as UN Secretary General Ban Ki-moon says, these investments must, "breathe new life into agriculture, one which permits sustainable yield improvements with minimal environmental damage and contributes to sustainable development goals".[10]

Private funding interest

Preferential access to credit and investment capital is one of the most important incentives to catalyze a transition to greener agriculture. Major financial institutions are expanding their green portfolios to offer investment credit to companies that manufacture and market products that enable more efficient use of agricultural inputs and introduce innovative private enterprises. The public sector should support finance

[10] 14. Ban Ki-moon. (2010). Media coverage of his statement: available at http://www.un.org/apps/news/story.asp?NewsID=26670 , retrieved on 26 January 2011.

mechanisms (e.g. loan-guarantee funds) that can leverage private capital loans to smallholders who need working capital to undertake sustainable agriculture practices.

Increasing consumer demand for sustainable food

Over the last few years, consumer demand for sustainably produced food has increased rapidly. Purchasing patterns of fairtrade products have remained strong despite the global economic downturn. In 2008, global sales of fairtrade products exceeded US$ 3.5 billion. The major markets for organic food and beverages expanded on average by 10 to 20 per cent per year between 2000. This demand has driven a similar increase in organically managed farmland.

A number of Caribbean countries have embarked on a process of organic production of traditional export crops such as sugar, bananas, coffee and cocoa. Most of the certified organic farms in the region are found in Cuba and the Dominican Republic and to a lesser extent in Guyana and Jamaica (ECLAC, 2004). Organic production is better oriented towards export markets where premium prices can be obtained. Although domestic food production can be carried out using organic methods the price of food would increase thus making such production unprofitable on account of a relatively small target market. However, organic food production could be undertaken for the tourist market.

The Benefits of Greening Agriculture

The greening of the agriculture sector is expected to generate a range of benefits including increased profits and income for farmers, gains at the macroeconomic level, enabling the sector to adapt to climate change and benefits for ecosystem services.

Profitability and productivity of green agriculture

Many studies have documented the profitability and productivity of sustainable farms, both in developed and developing countries. One study showed an average yield-increase of nearly 80 per cent as a result of farmers in 57 poor countries adopting 286 recent best practice initiatives, including integrated pest and nutrient management, conservation tillage, agroforestry, aquaculture, water harvesting and livestock integration. All crops showed water use efficiency gains, with the highest improvement occurring in rain-fed crops. Carbon sequestration potential averaged 0.35tC/ha/year. Of projects with pesticide data, 77 resulted in a decline in pesticide use by 71 per cent, while yields grew by 42 per cent.

A significant part of a farm's production costs is linked to its energy inputs and organic agriculture tends to be more energy-efficient. Growing organic rice can, for example, be four times more energy-efficient than the conventional method Mendoza 2002). Another study found that organic agriculture reduces production systems' energy requirements by 25 to 50 per cent compared with conventional chemical-based agriculture.

The other approach to restructuring is not to switch to organic production but to improve efficiency within the traditional industry and alter the marketing strategy. Both Guyana and Jamaica, the largest sugar producers in the CARICOM region, have been pursuing improvement in efficiency in the sugar industry. Guyana embarked on the construction of a new state-of-the-art sugar factory to expand production and reduce cost. The factory included a power co-generation element, to facilitate reduction in the cost of production by at least 50 per cent. Guyana expects that the modernization of sugar production through the use of high technology in processing will allow it to successfully compete in the European market as well as supply the Caribbean market with all its sugar requirements (ECLAC, 2006).

Macroeconomic benefits from greening agriculture

Significant secondary macro-economic and poverty reduction benefits are expected from greening agriculture. Investments aimed at increasing the productivity of the agriculture sector have proved to be more than twice as effective in reducing rural poverty than investment in any other sector (UNEP, 2011). In addition, green agriculture directs a greater share of total farming input expenditures towards the purchase of locally-sourced inputs (e.g. labour and organic fertilizers) resulting in a local multiplier effect. Overall, green farming practices tend to require more labour inputs than conventional farming (e.g. up to as much as 30 per cent more), creating jobs in rural areas.

Greening agriculture can relax foreign-exchange constraints by reducing the need for imported inputs and by increasing exports of sustainable agrifood products thus enabling countries in the region to purchase technology and other critical inputs for their economies.

Climate adaptation and mitigation benefits, and ecosystem services

Making agriculture more resilient to drought, heavy rainfall events, and temperature changes is closely linked to building greater farm biodiversity and improved soil organic matter. Practices that enhance biodiversity allow farms to use natural ecological processes to better respond to change and reduce risk. The use of species diversity serves as an insurance against future environmental changes by increasing the system's adaptive capabilities. Improved soil organic matter from the use of green manures, mulching, and recycling of crop residues and animal manure increases the water holding capacity of soils and their ability to absorb water during torrential rains.

The environmental services provided by greening farms are critical and far-reaching. Conversion to organic agriculture can increase carbon sequestration substantially. Also, emissions of nitrous oxides and methane could be reduced if farmers use nitrogen and other fertilizers more efficiently, including through precision applications and introducing improved crop varieties that more effectively access and use available nitrogen in the soil. Additional ecosystem benefits resulting from greening of agriculture

include better soil quality with more organic matter, increased water supply, better nutrient recycling, wildlife and storm protection and flood control.

Enabling Conditions for Agriculture in a Green Economy

The transition to green agriculture will require a supportive policy environment and enabling conditions that could help level the playing field between conventional and green agricultural practices.

There needs to be a greater use of regulations and taxes that impose penalties for pollution in order to include externality costs into market prices for these inputs, as well as economic incentives that reward green practices. There are also opportunities for applying market solutions as alternatives to direct regulation. In general, governmental subsidies for farmer (producer) support should be increasingly decoupled from crop production and alternatively be retargeted to encourage farmers' efforts and investments in adopting green agriculture practices.

Caribbean countries should advocate for changes in global trade and subsidy policies to liberalize trade in environmentally- friendly products and services while allowing them to protect some domestic food crops (special products) from international competition when they are particularly important to food security and rural livelihoods. The World Trade Organization already makes a dispensation for countries with a per capita GDP of less US$ 1,000. Furthermore, agricultural subsidies need to be redirected to encourage more diverse crop production with long-term soil health and improved environmental impacts. A major shift of subsidy priorities is needed in which governments would help reduce the initial costs and risks of farmers' transition efforts to implement sustainable farming practices.

National Policies

At the domestic public policy level, the key challenge is creating the conditions that would encourage more farmers to adopt environmentally sound agriculture practices instead of continuing to practice unsustainable conventional farming methods.

Support for improved land tenure rights of smallholder farmers

In order for farmers to invest capital and more labour into the transition to green agriculture, major land reforms will have to be implemented. In the absence of more secure rights to specific plots of land for many years into the future, many poor farmers are unlikely to take on additional risks and efforts to gradually build up the natural capital of their farms beyond a one or two-year horizon.

Public procurement of sustainably produced food

Government-sponsored food programmes for schools and public institutions and public procurement policies should be encouraged to source foods that are sustainably produced.

CASE STUDY

The Strategic Paper on Public Procurement, prepared by the UK Department for Environment, Food and Rural Affairs in 2008, provides a good example of how organic and sustainable products can be supported through public procurement policies.[11]

It advocates:

- Setting targets for more organic produce in public procurement
- Including appropriate clauses in tender documents (and provides examples)
- Creating better links between relevant government departments (e.g. Ministries of Agriculture and Health)
- Training procurement staff

Tourism-agriculture linkages could be strengthened and stressed in national tourism plans. Specific suggestions are for the development of community-based tourism products such as eco-tourism, rural-tourism, and agro-tourism.

Fiscal and Economic Incentives

Taxes on non-beneficial practices

Agriculture's environmentally damaging externalities could be reduced by imposing taxes on fossil fuel inputs and pesticide and herbicide use; and establishing specific penalties for air emissions and water pollution caused by harmful farming practices.

Tax exemptions for beneficial practices

Alternatively, tax exemptions for investments in integrated pest management products; and incentives that value the multi-functional uses of agricultural land have proven effective in improving the after tax revenues for farmers that practice sustainable land management. The OECD countries have developed a wide range of policy measures to address environmental issues in agriculture, which include economic instruments (payments, taxes and charges, market creation, e.g., tradable permits), community based measures, regulatory measures, and advisory and institutional measures (research and development, technical assistance and environmental labelling).

A number of Caribbean countries have removed taxes and duties on energy efficient products and renewable energy products such as fluorescent lights and solar water heaters.

A shift away from production-linked support can enable the agricultural sector to be more responsive to markets, thus improving growth. Further, societal and environmental benefits can be achieved by linking support measures to specific environmental objectives, research and development, information, and technical

[11] The paper is available at http://www.sustainweb.org/pdf2/org-238.pdf.

assistance, food inspection services, biodiversity, flood and drought control, and sinks for greenhouse gases and carbon storage.

Payment for Ecosystem Services

Payment for Ecosystem Services (PES) can further incentivise efforts to green the agriculture sector. PES verifies values and rewards the benefits of ecosystem services provided by green agricultural practices. A key objective of PES schemes is to generate stable revenue flows that help compensate farmers for their efforts and opportunity costs incurred in reducing environmental pollution and disruption of ecosystem services. Such PES arrangements should be structured so that small-scale farmers and communities, not just large landowners, are able to benefit. The use of PES schemes should be limited to those instances where appropriate safeguards have been put in place to avoid abuse.

Innovative PES measures could include the following:

- reforestation payments made by cities to upstream communities in rural areas of shared watersheds for improved quantities and quality of fresh water for municipal users
- ecoservice payments by farmers to upstream forest stewards for properly managing the flow of soil nutrients and surface waters
- methods to monetize the carbon sequestration and emission reduction credit benefits of green agriculture practices in order to compensate farmers for employing these practices

Finance programmes for smallholder farmers

Improving small farmers' access to working capital through microfinance is an option that would allow much greater numbers of small-scale producers to procure green inputs and related mechanization technologies.

Also, weather-indexed crop insurance could be made available for small farmers. The agriculture sector in general and small farmers in particular can be severely impacted by hurricanes and rainfall. This type of insurance is already available in certain Caribbean countries – as described in the box below.

CASE STUDY

Small farmers in Jamaica, Saint Lucia and Grenada are able to purchase "Livelihood Protection Policies" (LPPs) which provide insurance coverage against extreme weather events. Developed through the Climate Risk Adaptation and Insurance in the Caribbean Project led by the Munich Climate Insurance Initiative (MCII) in collaboration with CCRIF, MicroEnsure and Munich Re, the LPP provides quick cash payouts to policy holders if high winds and heavy rainfall trigger their policies

A second product, the Loan Protection Cover has been developed under the project, which is a loan portfolio hedge for lending institutions that effectively "insures" loan portfolios against climate risk so that these institutions can make loans to persons previously considered too risky for traditional lending.

Capacity Building and Awareness-Raising

The availability and qualitative capabilities of rural farmers are critical resources needed for implementing green agriculture practices. Green agricultural practices emphasize crop and livestock diversification; local production of natural fertilizer and other more labour intensive farm operations. The seasonal variability of crop-specific farming tasks affects temporal labour surpluses and shortages, which must be managed throughout the year.

Supply chains, extension services and NGOs

Green farming practices must be promoted and supported by information outreach and training programmes that are delivered to farmers and their supply-chain partners. These enhanced and expanded training programmes should build upon established agriculture extension service programmes where they exist (for example the Rural Agricultural Development Authority (RADA) in Jamaica). The green agriculture paradigm requires participatory learning in which farmers and professionals in agro-ecological sciences work together to determine how to best integrate traditional practices and new agro-ecological scientific discoveries.

Surveys among farmers' organizations across the region reveal that the average age of farmers has been increasing to 45 years old in most islands with the majority being over 60 years old (CaFAN, 2006). It has been found that small-scale farmers are not the easiest of groups to embrace innovation within their occupation especially among the older farmers who constitute an increasing percentage of the farmer population. This is often attributed to their many years of farming along with the wealth of local/indigenous knowledge they have among themselves. As such, it is essential for policy makers to include local knowledge to aid the development of new coping mechanisms for small-scale farmers.

Efforts should also be made to partner with NGOs that support farmers, agriculture colleges, demonstration farms and other such initiatives. It is also important to support small and medium business enterprises that are involved in supplying agriculture inputs; particularly those firms that offer green agriculture products and services such as organic certification auditing and reporting.

Institutionalization of green agriculture training

There are opportunities for increased training and building networks of professionals. Areas for training include the drafting of legislation for food safety, inspection and laboratory techniques. This should be supported by standardization of curricula in educational institutions to include concepts and practices of green agriculture.

Integrating information and communications technologies with knowledge extension

Support is needed to improve farmers' access to market information – using information technology and other avenues – in order to enhance their knowledge of real market prices so that they can better negotiate the sale of their crops to distributors and end customers.

There are also opportunities to support the construction of meteorological monitoring telemetry stations that could support national and regional weather forecasting capabilities that would help farmers determine best times for planting, fertilizer applications, harvesting and other critical weather-sensitive activities. Such networks could help support the introduction of innovative financial services such as weather-indexed crop insurance that would help reduce risks associated with adopting new technologies and shifting to green practices and marketing methods.

Data collection and dissemination

Caribbean countries need to improve statistical systems and increase research and development activities. Countries should undertake regular agricultural censuses and produce up-to-date agricultural statistics to facilitate research in areas such as the dynamics of the agricultural labour market, productivity of resource use, and the scope for new agricultural crops and processed commodities. National data collection systems could be supported by regional initiatives for monitoring and inspection that facilitate the achievement of common regional standards.

Better food choices

In an era where global human health is undermined by malnourishment and obesity, there is an opportunity to guide and influence people's food consumption into a greater balance with sustainably produced and more nutritious foods. Raising awareness about better food and its availability at affordable prices can reduce and reshape food demand trends. In this regard, there is a need to invest in public education and marketing that would encourage consumers to adopt more sustainable dietary habits (OECD 2008).

Tourism

Tourism is one of the world's largest business sectors, growing by 90 per cent from 1995 to 2010. It is responsible for over 250 million jobs or more than 8 per cent of total employment and accounts for over 9 per cent of the world's GDP (UNEP, UNDESA and FAO, 2012). Tourism is a vital sector of the economies of most small island developing states (SIDS) including those in the Caribbean. For more than half of the SIDS, it is their largest source of foreign exchange.

Defining Sustainable Tourism

Sustainable tourism is not a special form of tourism – it is not ecotourism – but it refers to all forms of tourism being sustainable. It requires a shift across the entire industry pertaining to the implementation of policies, practices and programmes that embrace sustainability, focusing on:

- conservation of natural resources, maintaining the resource base and protecting biodiversity and ecosystems
- the use of renewable sources of energy and increased energy efficiency – being more climate neutral
- reduction of water consumption
- waste minimization
- maintenance of culture, traditions and heritage and the promotion of cultural tolerance and respect
- generation of income for local communities
- the alleviation of poverty in communities

Thus, sustainable tourism takes into account the expectations of tourists regarding responsible natural-resource management (demand), and also the needs of communities that support or are affected by tourism projects and the environment (supply). Making tourism businesses more sustainable benefits local communities and raises awareness and support for the sustainable use of natural resources.

> The Global Sustainable Tourism Criteria (GSTC), are an international consensus on the minimum criteria that a tourism business should follow to approach sustainability. Focusing on social and environmental responsibility, as well as the positive and negative economic and cultural impacts of tourism, the criteria are organized into four topics: sustainable management, socio-economic impacts, cultural impacts, and environmental impact . Two sets of GSTC Criteria have been developed: for hotels and tour operators, and for destinations.
>
> *www.gstcouncil.org/sustainable-tourism-gstc-criteria.html*

Overview of the Tourism Sector in the Caribbean

The social, economic and environmental well-being of most Caribbean countries is tied to the tourism sector. Travel & Tourism plays a proportionately stronger role in relative contribution to GDP than any other comparable region. On average, tourism receipts represent almost 18 per cent of the Caribbean's total exports (WTTC, 2014). As well as its direct economic impact, the industry has significant indirect and induced impacts. The total contribution of Travel & Tourism comprises direct, indirect and induced impacts on the economy.

Direct contribution - the 'internal' spending on Travel & Tourism (total spending within a particular country on Travel & Tourism by residents and non-residents for business and leisure purposes) as well as government 'individual' spending - spending by government on Travel & Tourism services directly linked to visitors, such as cultural (eg museums) or recreational (eg national parks)

Indirect contribution - The GDP and jobs supported by:

- Travel & Tourism investment spending – an important aspect of both current and future activity that includes investment activity such as the purchase of new aircraft and construction of new hotels
- Government 'collective' spending, which helps Travel & Tourism activity in many different ways as it is made on behalf of the 'community at large' – eg tourism marketing and promotion, aviation, administration, security services, resort area security services, resort area sanitation services, etc
- Domestic purchases of goods and services by the sectors dealing directly with tourists - including, for example, purchases of food and cleaning services by

hotels, of fuel and catering services by airlines, and IT services by travel agents.

Induced contribution - The GDP and jobs supported by the spending of those who are directly or indirectly employed by the Travel & Tourism industry.

Some key statistics for the Caribbean in 2013 are shown in Table 4 below. However, these average figures conceal a wide disparity between individual economies. The figures are disproportionately impacted by the largest economies (Dominican Republic, Cuba, Puerto Rico) which happen to be relatively less reliant on tourism. A number of the smaller Caribbean economies have direct industry and economy GDP shares in excess of 10 per cent and 30 per cent respectively, with a very similar pattern in terms of employment.

Table 4: Key Caribbean Tourism Statistics – 2013

Statistic	2013 Value	Notes
Direct contribution to GDP	US$ 15.3 billion 4.4% of GDP	Economic activity generated by industries such as hotels, travel agents, airlines and other passenger transportation services; activities of the restaurant and leisure industries directly supported by tourists
Total contribution to GDP	US$ 49.0 billion 14.0% of GDP	including wider effects from investment, the supply chain and induced income impacts
Visitor exports	US$ 26.2 billion – from 20,171,000 visitors 18% of all exports	Foreign visitor spending or international tourism receipts
Direct jobs	607,000 3.6% of total employment	This includes employment by hotels, travel agents, airlines and other passenger transportation services, restaurant and leisure industries
Total jobs	1,909,000 11.3% of total employment	including wider effects from investment, the supply chain and induced income impacts

Source: Travel & Tourism Economic Impact 2014 Caribbean, World Tourism & Travel Council

Challenges and Opportunities for Tourism in a Green Economy

Challenges in the Caribbean Tourism Sector

Even though tourism generates significant income for the region, the majority of this income – perhaps as high as 80 cents in every dollar – "leaks out" of the Caribbean. Furthermore, many of the jobs created are seasonal and very low-paid, while the money generated by internationally funded projects fails to reach locals. For example, only 15 per cent of the Chinese-funded Baha Mar construction project in the Bahamas found its way to local labourers (Kennedy, 2014). Tourism could have a tremendous beneficial impact on local economies, but many hotels source their food and cleaning products from abroad rather than purchasing them from local producers. An Oxfam study found that hotels in Saint Lucia imported more than 70 per cent of their produce every year.

The tourism industry faces a multitude of other significant sustainability-related challenges, including energy and GHG emissions, water consumption; waste management, loss of biological diversity, and effective management of cultural heritage.

Energy and GHG emissions

The tourism sector's growing consumption of energy, especially in travel and accommodation, and its dependence on fossil fuels has important implications for global GHG emissions and climate change as well as for future business growth. Tourism is estimated to create about 5 per cent of total GHG emissions, primarily from tourist transport (75 per cent) and accommodation (21 per cent).

Tourism's increasing energy consumption is due to growth rates in international tourist arrivals and domestic travel, trends to travel further and over shorter periods of time; as well as preference given to energy-intense transportation (e.g. aircraft and car travel over train and bus. The sustainability and competitiveness of tourism depends in part on energy efficiency (reduction in overall energy use) and a more intensive use of renewable resources.

As noted above, after transport, accommodation is the most energy-intensive component of the tourism industry – through its demand for cooling, lighting, water heating, cooking, cleaning, pools and sometimes the desalination of seawater. A general rule is that the more luxurious the accommodation, the more energy will be used. Given that most Caribbean countries import their energy supplies, investment in greening tourism is vital to reducing additional burdens placed on other sectors.

While Caribbean countries' contribution to global GHG emissions is relatively small, climate change presents one of the most significant challenges to the sector. Rising sea levels have can cause loss of land along coastlines of low-lying islands, disrupting economies and livelihoods. For example, a 50-centimeter rise in sea level will result in Grenada losing 60 per cent of its beaches (SIDS, 2014). Climate change may cause coral

bleaching to become an annual occurrence causing further losses in revenue. Dominica has reported that 50 per cent of its corals are bleached, and coral bleaching in Tobago affected an average of 66 per cent of its hard corals in 2005 alone.

Water consumption

While water use by tourism, on a global basis, is far less important than agriculture, industry, or urban domestic use, in some countries and regions, tourism can be the main factor in water consumption. In such areas, it can increase pressure on already diminished water resources and compete with other sectors as well as subsistence needs of local populations. Tourism can also directly affect water quality, for example, through the discharge of untreated sewage or freshwater abstraction.

Direct water use in tourism varies between 100 and 2,100 litres per guest night, with a tendency for larger, resort-style hotels to use significantly more water than smaller establishments or campsites. The main water-consuming factors are golf courses, irrigated gardens, swimming pools, spas, wellness facilities and guest rooms. In Europe, one study states that each tourist consumes 300 litres of freshwater per day on average, whereas luxury tourists can consume up to 880 litres. By comparison, average per capita residential consumption in Europe is estimated at 241 litres per day (UNEP, 2011).

The impact is even more pronounced in Caribbean countries and other SIDS. In many of these countries potable water is scarce, caused by either a physical absence of freshwater or because the necessary infrastructure or resources are lacking. The tourist industry can create situations of stark water inequity between tourists and neighbouring communities. Tourism's water demands can lead to the appropriation of supply to the detriment of local domestic and agricultural needs, caused by the overexploitation of aquifers and reservoirs and the lowering of groundwater tables.

CASE STUDY

Golf tourism is rapidly expanding. An estimated 9.5 billion litres of water are used to irrigate the world's golf courses per day, equivalent to the daily needs of 80 per cent of the global population. One Mediterranean island, where water is so scarce it must sometimes be shipped in, is planning to increase its golf courses from three to 17, with tourism cited as the principal driver. This will involve building over agricultural land and constructing several desalination plants to ensure continual supply (Tourism Concern 2009).

Waste management

Waste management is another increasing and well-recognised challenge in the industry. Waste is generated not only from hotels and other torism facilities but also from cruise ships sailing through the Caribbean which dump waste into the sea. One 2002 study found that a ship carrying 2,000 passengers and 1,000 crew generated the same amount

of waste as a small city (Kennedy, 2014). This waste, including oil residues, harms marine ecosystems, including coral reefs.

Impacts are also considerable for wastewater management, even in high-income countries. In the Caribbean, hotels often discharge untreated sewage directly into the sea. In general, 60 per cent of water used in tourism results in sewage in need of disposal (UNEP, 2011).

Loss of biological diversity

Large-scale tourism developments have had detrimental effects on biodiversity, including coral reefs, coastal wetlands, rainforests, and mountainous areas. Coral ecosystems have suffered strong adverse impacts from the use of coral for construction materials for hotels, over-fishing off reefs to feed tourists, sewage dumping and sedimentation from improperly managed runoff from buildings, parking lots, and golf courses. Coastal wetlands, particularly mangroves, have routinely been damaged or destroyed to build beach resorts.

Failure to incorporate biodiversity concerns in destination planning and investment will have detrimental effects on the natural environment, increase conflict with local communities, and lead to reduced value-creation potential for both the destination and investors (especially given the increasing interest around the world in nature-based tourism, which represents a strategic argument for maintaining biodiversity in Caribbean tourist destinations).

Management of cultural heritage

Interest in unique cultures by tourists can result in adverse impacts and severe disruption for communities. There are examples of communities overrun by large numbers of visitors, commercialization of traditions and threats to cultural survival from unplanned and unmanaged tourism. Frequently, the cultural issues overlap and are aggravated by environmental issues such as access to water and coastal resources.

Opportunities for the Caribbean Tourism Sector in a Green Economy

There are a number of trends and developments that provide promising opportunities for greening tourism.

Sizing and growth of the tourism sector

Tourism is one of the most promising drivers of growth for the world economy. The sheer size and reach of the sector makes it critically important from a resource perspective. Even small changes toward greening can have important impacts. Furthermore, the sector's connection to numerous sectors at destination and international levels means that changes in practices can stimulate changes in many different public and private actors. The tourism economy represents 5 per cent of global GDP, while it contributes to about 8 per cent of total employment.

Tourist arrivals have shown continuous yearly growth over the last six decades, with an average 4 per cent annual increase during 2009 and 2010 and is expected to continue to grow – despite occasional disruptions due to international crises. Proportionately, tourism will grow faster in less developed countries than in developed economies in the next ten years. Recent trends and forecasts point to a spreading of tourism to new destinations, largely in developing countries, where there is outstanding potential to support development goals, and where new environmental and cultural attributes can make an important contribution to more sustainable tourism destinations (UNEP, 2011).

Changing consumer patterns

Tourist choices are increasingly influenced by sustainability considerations. It has been found that a majority of international tourists are interested in the social, cultural and environmental issues relevant to the destinations they visit and are interested in patronizing hotels that are committed to protecting the local environment. In 2007 TripAdvisor surveyed travellers worldwide and 38 per cent said that environmentally-friendly tourism was a consideration when travelling, 38 per cent had stayed at an environmentally-friendly hotel and 9 per cent specifically sought such hotels, while 34 per cent were willing to pay more to stay in environmentally-friendly hotels (Pollock 2007).

Increasingly, tourists view local environmental and social stewardship as a responsibility of the businesses they support. Research also indicates that consumers are concerned about the local environments of their travel destinations and are willing to spend more on their holidays if they are assured that workers in the sector
are guaranteed ethical labour conditions in the places they are visiting (UNEP, 2011). While this trend toward tourists supporting sustainable tourism is increasing, there is some contrary data. One study indicated that less than a third of American travellers indicate a willingness to pay some sort of premium for green travel, higher prices (cost premium) being seen as a demand barrier for the majority of respondents.

Traditional mass tourism such as “sun-and-sand” resorts has reached a steady growth stage. In contrast, ecotourism, nature, heritage, cultural and soft adventure tourism, as well as sub-sectors such as rural and community tourism are taking the lead in tourism markets and are predicted to grow most rapidly over the next two decades. It is estimated that global spending on ecotourism is increasing at a higher rate than the industry-wide average growth.

Potential for local development and poverty reduction

Making tourism more sustainable can create stronger linkages with the local economy, increasing local development potential. Of particular importance are:

- purchasing directly from local businesses
- recruiting and training local unskilled and semi-skilled staff
- entering into neighbourhood partnerships to make the local social environment a better place to live, work and visit

- ability to improve the local natural environment

Benefits of Tourism in a Green Economy

Tourism drives significant investments. Adding even small percentages of investment for a greener tourism sector results in very significant increases in investment flows. A tourism product is a combination of different activities and inputs produced by many sectors: enhanced spending by tourists can benefit agriculture, handicrafts, transport, water and waste management, energy efficiency and other services. Importanty, increased investment could have greater impact on green outcomes. As tourism development at destinations requires investment in facilities such as roads, water supply, and energy, it improves the basic common infrastructure facilities required for development of other sectors and improvement of quality of life

Benefits in employment

Tourism is human-resource intensive due to the service nature of the industry. It allows for quick entry into the workforce for youth and women. Sustainable tourism investment can help create job opportunities, especially for poorer segments of the population. Additional employment in energy, water, and waste services and expanded local hiring and sourcing are expected from the greening of mainstream tourism segments. This also is likely to significantly expand indirect employment growth opportunities from segments oriented toward local culture and the natural environment.

CASE STUDY

It is estimated that sustainable tourism in Nicaragua, a destination that focuses very prominently on its culture and natural environment, has an employment multiplier of 2. That is, for every job in the tourism sector, additional local employment is created, with higher wages than the national averages (Rainforest Alliance 2009).

Local economic development and poverty reduction

In destinations where a large percentage of tourist needs are locally supplied (beds and linens, food and beverage, equipment and supplies, labour, tour and transportation services, souvenirs, among others), local contribution and multipliers tend to be high, and the resulting economic impact correspondingly greater. More sustainable tourism can increase both the local contribution and multiplier effect as local communities are involved in the tourism industry, through the supply of products, labour, tourism services and, increasingly, green services. Figure 3 shows an example of local community benefits in Malaysia.

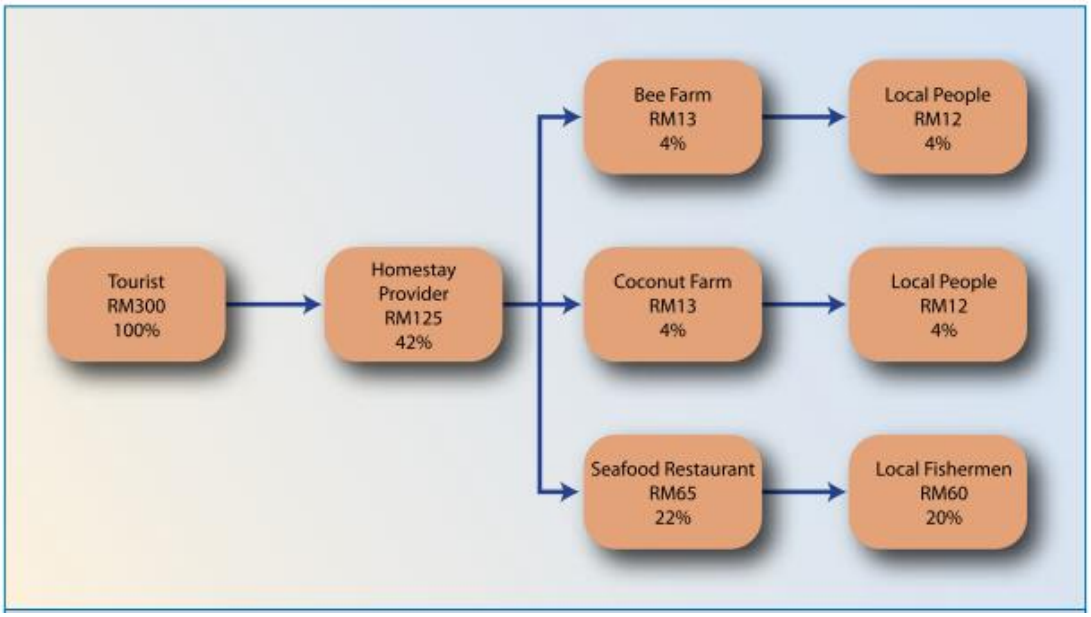

Figure 3: Accommodation linkages and tourist income distribution in Tanjong, Piai, Malaysia

When tourism-related income grows with a substantial reorientation in favour of the poor, poverty can be reduced. Local and national governments as well as investors and developers play a critical role in determining the role poorer populations play in the tourism industry. Tourism leaders can also help by engaging in and encouraging the use of local companies for the provision of transport, services and food in order to generate local income and employment multipliers and contribute to alleviate local poverty.

in 2002 the UNWTO launched the Sustainable Tourism for the Elimination of Poverty initiative (ST-EP), aimed at reducing poverty levels through developing and promoting sustainable forms of tourism (UNEP, 2011). ST-EP has identified seven different mechanisms through which the poor can benefit directly or indirectly from tourism:

- undertaking measures to increase the level of the poor working in tourism enterprises
- maximizing the proportion of tourism spending that is retained in local communities and involving the poor in the supply process
- promoting the direct sales of goods and services to visitors by the poor from informal businesses
- establishing and managing more formal tourism enterprises by the poor, either individually or at a community level
- using taxes or levies on tourism income or profits with proceeds benefiting the poor
- supporting the poor in money or in kind, by visitors or tourism enterprises

- investing in infrastructure that offers local communities the chance to gain new access to available resources

Environmental benefits

In hotels and other accommodation there is considerable scope for investment in energy-efficient features and services, including cooling (air conditioning), refrigeration, television and video systems, air conditioning and water heating, and laundry.

Internal water efficiency and management programmes, and investments in water-saving technology in rooms, facilities and attractions reduce costs and apply less pressure on scarce water resources.

Improved waste management provides opportunities for business and society. Lower levels of generation improves financial return for the private sector, and better management of that waste creates opportunities for jobs and enhances the attractiveness of the destination.

Sustainable tourism encourages effective conservation of sensitive ecosystems. It will encourage an increase in conservation and tourism revenues (including protected-area fees) resulting in a greater transfer of benefits toward natural areas.

Sustainable tourism will encourage the protection of cultural heritage, which includes living cultures as well as historical, religious, and archaeological sites.

Enabling Conditions for Tourism in a Green Economy

A set of enabling conditions is required for tourism to become sustainable: to contribute to social and economic development within the carrying capacities of ecosystems. A cross-cutting barrier to greener or more sustainable tourism investment is the lack of understanding and recognition of the value created for companies, communities and destinations from the greening of tourism. The sharing of knowledge, information and experiences among the public, private and civil society sectors is a necessary first step towards overcoming these barriers.

Private Sector Orientation

Tourism businesses and government institutions in charge of tourism should adopt innovative and appropriate technology to improve the efficiency of resource use (notably energy and water), minimize emissions of greenhouse gases (GHG) and the production of waste, while protecting biodiversity.

Enabling conditions for engaging the industry

Tourism promotion and management organizations and resource management agencies should link tourism products (for example, parks, protected areas and cultural sites) more closely with marketing positions. This will ensure a consistent and unique selling

position in world tourism markets based on high-value experiences at natural and cultural sites in a compact geographical area

Tourism industry associations and wider industry platforms play an important role in engaging tourism businesses in sustainability as well as developing practical tools to respond to many common challenges. As in most industries, the concept of corporate social responsibility (CSR) is increasingly recognized in the tourism sector and is being promoted by industry bodies, at the international and national levels. Governments and the private sector should develop mechanisms and tools such as triple-bottom-line reporting, environmental management systems and certification to facilitate the adoption of CSR in tourism enterprises, especially SMEs.

CASE STUDY

The Caribbean Tourism Organization works alongside the Caribbean Alliance for Sustainable Tourism on the Caribbean Hotel Energy Efficiency Action Programme to reduce carbon dioxide emissions in the region. The purpose of this project is to help make the tourism sector, and hotels in particular, more energy efficient and possibly obtain carbon credits through the reduction of carbon dioxide emissions. This project was implemented with the goal of making the participants eligible for the Climate Investment Fund that will help make further projects possible.

Government, private sector and civil society should engage with international development institutions, such as multilateral and bilateral cooperation agencies, to advocate for programmes that inform, educate and work collaboratively with the tourism industry to integrate sustainability into policies and management practices.

The increased use of industry-oriented decision-support tools would help speed the adoption of green practices. Hotel Energy Solutions, TourBench and SUTOUR are examples of projects designed to provide assistance to Europe's tourism enterprises to identify potential investments and cost-saving opportunities for sustainable decision making to ensure profitability and competitiveness (saving money and investment in ecological building measures and equipment with low energy consumption), provide visitor satisfaction (fulfilling their demands and expectations for high environmental quality), achieve efficient use of resources (minimizing the consumption of water and non-renewable energy sources), secure a clean environment (minimizing the production of CO_2 and reducing waste), and conserve biological diversity (minimizing the usage of chemical substances and dangerous waste products).

The promotion and widespread use of internationally recognized standards for sustainable tourism is necessary to monitor tourism operations and management. Criteria, objectives and targets can be identified and incorporated into tourism entities' investment plans and business operations. The GSTC provides a current comprehensive

system to enable private sector investment and should be adopted to assess the tourism industry's performance.

Destination Planning and Development

A country's tourism development strategy must be sensitive to its unique assets and challenges, while creating a vision to deliver its goals for sustainability. Advancing greening goals through tourism planning and destination development requires the ability and institutional capacity to integrate multiple policy areas; consider a variety of natural, human and cultural assets over an extended time frame; and put in place the necessary rules and institutional capacity.

Enabling conditions for greener destination planning

Tourism ministries, community and private tourism authorities must establish mechanisms for coordinating with ministries responsible for the environment, energy, labour, agriculture, transport, health, finance, security, and other relevant areas, as well as with local governments. Clear requirements such as zoning, protected areas, environmental rules and regulations, labour rules, agricultural standards, and health requirements (particularly for water, waste and sanitation) establish clear rules and define the operating climate for investment.

Organizations engaged in developing tourism strategies should make use of credible scientific methods and tools encompassing economic, environmental and social approaches and assessments for sustainable development that will help stakeholders related to different components of the tourism value chain understand their environmental and socio-cultural impacts.

Tourism master plans or strategies should include environmental and social issues to manage the critical assets and promote greener outcomes. These strategies should be based on assessment of carrying capacity and social issues to take into account external and internal impacts of tourism on the society. Green transformation programmes will be more effective if produced by a multi-stakeholder participatory planning process, as well as through the development of partnerships at local, national, regional and international levels. This process should include commitments to multilateral environmental and social agreements and the organizations that support them.

Fiscal Policies and Economic Instruments

The greening of tourism will require a more sophisticated use of instruments by the government, such as fiscal policy, public investment, and pricing mechanisms for different public goods. Tourism investment from government should focus on business motivations for sustainable management. Incentives should promote environmental protection and creation of economic value. Selected interventions must promote a more efficient allocation of goods and resources than would occur without government action. Social policy should address compensation and benefits to workers, access to

improved opportunities, human resource development, and value chain integration strategies.

Enabling conditions in fiscal and government investment policies

Policy intervention should promote the sustainable use of natural resources and therefore create positive externalities for the society. Less productive uses of natural resources (i.e. unsustainable agriculture) or possible depletion activities (i.e. housing construction) could be compensated (for their opportunity cost) with policy instruments that increase profitability for sustainable tourism businesses and generate positive environmental externalities. Free-riding (non-compliance by companies) should be prevented with an effective performance monitoring and impact evaluation mechanism.

Government investments in protected areas, cultural assets, water, waste management, sanitation, transportation and energy infrastructure investments will attract private sector investment decisions toward greener outcomes. Investments in public infrastructure related to tourism or investments in private tourism businesses should estimate their social and environmental impacts and adopt economic measures to compensate and offset unavoidable impacts.

Appropriate taxation and subsidy policies should be framed to encourage investment in sustainable tourism activities and discourage unsustainable tourism. Taxation can be used to keep developments within given limits (for example, taxes on use of resources and services) and controlling specific inputs and outputs (such as effluent charges and waste services).

Tax concessions and subsidies can be used to encourage green investment. Subsidies can be given on purchase of equipment or technology that reduces waste, encourages energy and water efficiency, or the conservation of biodiversity (payments for environmental services) and the strengthening of linkages with local businesses and community organizations.

Financing Green Tourism Investments

Environmental and social investments are relatively new, and remain outside the mainstream of financial markets. Therefore, effort is needed to raise awareness of green investment opportunities and to reduce uncertainty for banks and other investors.

Enabling conditions for finance

The single greatest limiting factor for SMEs in moving toward greener tourism is lack of access to capital for this type of investments. Green investments must be seen as adding value and made on their economic and financial merits, without prejudice. This will require greater private sector awareness of the value of green investment, and also policy coordination with Ministries of Finance and regulatory authorities.

Regional funds for local tourism development could help overcome financial barriers for green investments where investments also generate public returns (through positive externalities). Foreign Direct Investment (FDI), private equity, portfolio investment, and other potential funding sources should be aligned with sustainable projects and strategies for the tourism industry.

Countries should mainstream sustainability into tourism development investments and financing. The Sustainable Investment and Finance in Tourism (SIFT) network is working to integrate the expectations of private investors, the leveraged strength of the financing and donor community, and the needs of developing destinations. The SIFT network aims to encourage greater investments by public, private and multilateral investors in sustainable tourism.

Establish partnership approaches to spread the costs and risks of funding sustainable tourism investments. For example, in implementing sustainability projects, SMEs could benefit from in-kind support like technical, marketing or business administration assistance, from firms offering these services at low cost. In addition, loans and loan guarantees could include more favourable grace periods or offer longer repayment periods. Loans for sustainable tourism projects could be set up with guarantees from aid agencies and private businesses, lowering risk and interest rates.

Expand the use of solidarity lending mechanisms to permit groups of local suppliers to access credit and build capital. Solidarity lending (guarantees provided by a peer group) has proven successful in fisheries, agriculture, and handicrafts – all industries of critical importance to successful sustainable tourism destinations.

Enhance development bank access to individuals and small businesses that are not eligible for credit, or are involved in the provision of public services (such as protected areas management, guiding, waste management, infrastructure construction).

Establish seed funds to permit new green industries to develop locally. For example, solar collectors and photovoltaic systems can be imported as complete systems, or can be assembled locally from imported components. The latter encourages local investment and promotes local economic contribution. It also permits adaptation of the technologies to better suit local tourism needs.

Module 4 Main Project

- Select one national policy with which you are familiar – e.g. a national development policy or a sector-specific policy.
- Analyze the policy with respect to its contribution to facilitating a green economy.
- Determine what conditions or considerations should be added to improve its contribution to a green economy.