GREEN economy

UNEP

Scoping Study for Jamaica

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Front cover photo: Jamaica Information Service.

Jamaica

Green Economy Scoping Study

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ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ADRM	Agriculture Disaster Risk Management
ACS	Association of Caribbean States
ACSSD-GE	Advancing Caribbean States' Sustainable Development through Green Economy
ATL	Appliance Testing and Labeling
BREEAM	Building Research Establishment Environmental Assessment Methodology
BRICS	Brazil, Russia, India, China and South Africa
CANARI	Caribbean Natural Resources Institute
CARIBCAN	Caribbean-Canada Trade Agreement
CARICOM	Caribbean Community
CCCCC	Caribbean Community Climate Change Centre
CNG	Compressed Natural Gas
CDEMA	Caribbean Disaster Emergency Management Agency
COTED	Council for Trade and Economic Development
CSME	CARICOM Single Market and Economy
DO	Development Orders
DSM	Demand Side Management
EAST	Environmental Audits for Sustainable Tourism
EEBC	Energy Efficiency Building Code
EFF	Extended Fund Facility
EMS	Environmental Management Systems
EPA	Economic Partnership Agreement
ESET	Electricity Sector Enterprise Team
ESSJ	Economic and Social Survey of Jamaica
ETB	Economics and Trade Branch
EU	European Union
FAO	Food and Agriculture Organization
GBP	Green Building Practices
GBRS	Green Building Rating System
GDP	Gross Domestic Product
GEAJ	Green Economy Assessment of Jamaica
GoJ	Government of Jamaica
ha	Hectare

Hon.	Honourable
ICC	International Code Council
IDB	Inter-American Development Bank
IECC	International Energy Conservation Code
IgCC	International Green Construction Code
ILO	International Labour Organization
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resources Management
JASPEV	Jamaica Social Policy Evaluation
JHTA	Jamaica Hotel and Tourist Association
JOAM	Jamaica Organic Agriculture Movement
JPS	Jamaica Public Service
JSIF	Jamaica Social Investment Fund
JTB	Jamaica Tourist Board
KMA	Kingston Metropolitan Area
kWh	Kilowatt-Hour
LEED	Leadership in Energy and Environmental Design
MDA	Ministry, Department and Agency
MSME	Micro, Small and Medium Enterprises
MSTEM	Ministry of Science, Technology, Energy, and Mining
MTE	Ministry of Tourism and Entertainment
MTSEPF	Medium Term Socio-Economic Policy Framework
MW	Megawatt
MWLECC	Ministry of Water, Land, Environment, and Climate Change
NBC	National Building Code
NEPA	National Environment and Planning Agency
NHT	National Housing Trust
NRW	Non-Revenue Water
NUSAs	Non-Utility Service Areas
NWC	National Water Commission
ODPEM	Office of Disaster Preparedness and Emergency Management
OUR	Office of Utilities Regulation
PATH	Programme for Advancement through Health and Education
PIOJ	Planning Institute of Jamaica
PPA	Power Purchase Agreement
PV	Photovoltaic
RADA	Rural Agricultural Development Authority
REDI	Rural Economic Development Initiative
RIO+ 20	United Nations Conference on Sustainable Development
ROLAC	Regional Office for Latin America and the Caribbean
SAMOA	Small Island Developing States Accelerated Modalities of Action
SIDS	Small Island Developing States
STATIN	Statistical Institute of Jamaica
TEF	Tourism Enhancement Fund
TEMC	Tourism Emergency Management Committee
TOR	Terms of Reference
TPDCO	Tourism Product Development Company
UNEP	United Nations Environment Programme
USAs	Utility Service Areas
USAID	United States Agency for International Development
UWI	University of the West Indies
UWIC	University of the West Indies Consulting
WRA	Water Resources Authority
WRMC	Water Resource Management Committee
WMA	Water Management Area
WTO	World Trade Organization

FOREWORD

By the most simplistic definition, a green economy is one that is low carbon, resource efficient and socially inclusive. It aims for sustainable development without degrading the environment. At the heart of the green economy is the concept that wealth and economic stability must not come at the cost of environmental degradation, ecological destruction and social inequality.

The Government of Jamaica (GoJ) is committed to building a green economy. This commitment is envisaged in the country's long-term development plan, Vision 2030 which seeks to guide the country to achieve its goals of sustainable development and prosperity by 2030.

The Millennium Ecosystems Assessment states that 60 percent of the world's major ecosystem goods and services that underpin livelihoods have been degraded or used unsustainably. This is because economic growth in recent decades has been accomplished mainly through drawing down natural resources without allowing stocks to regenerate, as well as allowing widespread ecosystem degradation and loss.

According to the new World Bank Group Environment Strategy for 2012-2022, "Toward a Green, Clean, and Resilient World for All," environmental degradation, pollution, or overexploitations of natural resources hamper economic progress.

Armed with this knowledge, Jamaica is moving towards the implementation of green economy policies through increased investment in renewable energy projects, and instituting energy-efficiency programmes.

In 2012, Jamaica was among three pilot countries, including Saint Lucia and Haiti, that were selected under the European Commission-supported regional project entitled "Advancing Caribbean States' Sustainable Development through Green Economy (ACSSD-GE)". The GoJ is grateful for having had the opportunity to participate in this globally important project.

The national project has resulted in the production of the Green Economy Assessment Scoping Study. The sectors covered in this study were Agriculture, Construction, Energy, Tourism, and Water. These sectors were selected to be the first for examination under the project, due to their direct impact on the environment as well as their contribution to the economic development of Jamaica.

In addition, the sectors are cross-cutting and any advancements made in their transitioning would have a wider impact on all Jamaicans.

The development of the Scoping Study under the ACSSD-GE Project actively incorporated multi-stakeholder partnerships and collaboration. As such, it is hoped that the information gleaned from this Scoping Study will form the basis for the implementation of projects and programmes that will result in sustainable use of the country's natural resources, provide decent jobs for working people; and develop additional practices that will allow Jamaica to be more climate resilient and truly become, as is envisioned in Jamaica's National Development Plan, "the place of choice to live, work, raise families, and do business".

The Honorable Daryl Vaz
Minister Without Portfolio
Ministry of Economic Growth and Job Creation

Small island developing states like Jamaica have unique vulnerabilities, which result in them paying a disproportionate price for the impact of climate change on weather and ocean patterns. Their future well-being, therefore, depends on our ability to deliver the 17 goals of the 2030 Agenda for Sustainable Development and the inclusive green economy that underpins it. This study identifies key sectors and actions that could help Jamaica make that transition, charting a path that would overcome its constrained fiscal state and strengthen its environmental and economic resilience.

"Vision 2030 Jamaica" is one of the first national planning documents to place the green economy at its core, reinforcing the country's emerging reputation as a model for fiscal policies that complement the conservation of natural capital. Building on that work, this study explores the agriculture, construction, energy, tourism and water sectors to provide guidance on how strategic policies and investment can turn Jamaica's vision into reality.

For example, 90 per cent of Jamaica's energy currently depends on imported petroleum. For the country's largest electricity purchaser, the National Water Commission, the study has identified that developing local water catchment facilities would both reduce demand for energy and increase access to water. Further expanding the share of domestic renewables would not only improve self-sufficiency and sustainability in every sector, but would also make the national economy more competitive and more prosperous. This study will help public and private sector decision makers identify key opportunities to achieve this, including improving access to financing for renewable projects and increasing the price offered for renewable energy under net billing.

Jamaica's existing policies and programmes provide an excellent starting point for this study's recommendations, which were developed with help from many of the country's visionary stakeholders who can also help deliver them. UNEP warmly welcomes Jamaica's leadership on the transition to an inclusive green economy in the region and I hope that nations of all shapes and sizes will learn from its approach to driving sustainable development.

Achim Steiner
Executive Director of the United Nations Environment Programme

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Activities of the project in Jamaica were coordinated by the University of the West Indies (UWI) Consulting under which the Green Economy Scoping Study was prepared by Dr. Michael Witter with supporting sectional authors, namely Brian Bernal- Construction, Elizabeth Emanuel- Energy, Kevon Rhiney- Agriculture, Wesley Vanriel- Tourism and Marjorie Segree-Water

The Government of Jamaica would like to express its sincere appreciation to the European Union, the UNEP Division of Technology, Industry and Economics (DTIE), UNEP Regional Office for Latin America and the Caribbean (ROLAC) and the Project Management team at the University of the West Indies (Mona) for their support in the preparation of this 'Green Economy Scoping Study for Jamaica'. This Study will contribute to the achievements of targets relating to the Green Economy and Jamaica's Vision 2030 National Development Plan.

We wish to acknowledge with appreciation that, the Study was guided by the national Green Economy Steering Committee (GESC) led by the Ministry of Water, Land, Environment and Climate Change under the Chairmanship of Lt. Col. Oral Khan, Chief Technical Director and coordinated by Andrea Jones Bennett of the Ministry. Membership of the GESC included representatives from Ministry of Water, Land, Environment and Climate Change (MWLECC); Ministry of Industry, Investment and Commerce (MIIC); Ministry of Tourism and Entertainment (MTE); Ministry of Finance and Planning (MOF); Ministry of Transport Works and Housing (MTWH) National Environment and Planning Agency (NEPA); Planning Institute of Jamaica (PIOJ); Ministry of Agriculture and Fisheries (MOAF); Ministry of Science, Technology, Energy and Mining (MSTEM) and Jamaica Promotions Corporation (JAMPRO).

The Government of Jamaica appreciates the support and participation received in the development of the Scoping Study from the public sector, private sector, academia, civil society, youth – interest and other non-governmental organisations.

The Government of Jamaica thanks the UNEP Green Economy Team supervised by Steven Stone, Chief of the Economics and Trade Branch (ETB) and Mara Murillo Correa, Deputy Regional Director for the Regional Office of Latin America and the Caribbean (ROLAC) . Recognition is given to members of the team including Asad Naqvi, Acting Head of the Advisory Services Unit, Ronal Gainza Carmenates of ETB and Matias Gallardo of ROLAC for their close interaction during the development process. Edwin Laurent was special advisor for the project and reviewed the report. Additional communications, project and administrative support from UNEP was provided by Ardeshir Zamani, Désirée Leon, Rahila Somra, Fatma Pandey, Anita Beck, Chiara Moroni, Eirik Lindebjerg, Ravenna Nuaimy-Barker, Simon Lobach, William Scott, Hameedullah Jamali, Sol Jimenez and David Schockenhoff. Final editing by CPSL Language Services. Design and layout by Michel Favre based on the original design of Thomas Gianinazzi.

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The Green Economy Scoping Study for Jamaica will be utilised as a tool towards sustainable development which is possible, thanks to the dedication and participation of every Jamaican, as we work to make the Jamaica "the place of choice to live, work, raise families and do business".

1 SUMMARY

Green renewable energy with photovoltaic solar panels on roof – © shutterstock

Bamboo River Tourism in Jamaica – © Scott Griessel – Creatista.

Greening the economy is a strategy for sustainable development of Jamaica first adopted adopted in Vision 2030, Jamaica's long-term development plan. The greening strategy for the Jamaican economy proposed in this study is designed to build economic and environmental resilience, promote inclusive economic growth, transform the energy sector to utilize indigenous renewable resources more intensively, overcome the fiscal limits arising from high levels of indebtedness and the current programme of adjustment, and further progress toward sustainable development. The strategy envisions mitigating the historical trends of economic activities that are dependent on free or cheaply priced natural resources and imported petroleum for energy, utilize technologies that have high impacts on the natural environment, and distribute income unequally.

Following the Third UN Conference on Small Island Developing States (SIDS) convened in Samoa in 2014, the Government of Jamaica (GoJ) is clear in its commitment to pursuing sustainable development initiatives through international, regional, and local partnerships. At the international level, the GoJ is diversifying its international economic relations, and especially, partnering with other SIDS to access the international resources for greening economies, such as the Green Climate Fund. Jamaica remains committed to strengthening the regional economic cooperation in the CARICOM Single Market and Economy (CSME) and the Economic Partnership Agreement (EPA) with the European Union (EU).

At the national level, the challenge is to enhance competitiveness in both the international and the domestic markets by increasing the productivity of Jamaican capital and labour. Economic resilience requires managing the risks from international market shocks while building local capacity.

Disaster risk reduction strategies and adaptation to climate change are the principal strategies for

building environmental resilience for a hazard-prone SIDS like Jamaica. This too requires partnerships with the international community, both for preparedness for hazards, and the recovery from natural disasters that may occur. Regional cooperation for disaster preparedness is served by the CARICOM body, the Caribbean Disaster Emergency Management Agency (CDEMA), with the most recent emphasis on implementing a regional strategy for "achieving development resilient to climate change."[1]

The fundamental prerequisites for inclusive growth are green investments that provide decent jobs, as defined by the International Labour Organization (ILO), and opportunities for Micro, Small and Medium Enterprises (MSME). Green investments have to be encouraged with macroeconomic stability and a mix of fiscal and other kinds of incentives to minimize the risk and enhance the potential for profitability. Apart from the technological requirements for skilled workers, international competitiveness demands investment in building the capabilities of the workforce through education and relevant training. In the recent past, Jamaica has attracted substantial inflows of foreign investment, but these have not had sufficient impact to break the secular stagnation of the economy. The task for a green investment strategy is not only to incentivize the inflows, but to complement them with the quality workforce, infrastructure and social conditions that will facilitate inclusive growth.

An enabling policy framework has been sketched for the economy as a whole, as well as for the target sectors. Many policy initiatives already exist, and some others are proposed. The GoJ's commitments to partnerships should extend to its Ministries, Departments and Agencies (MDA), so as to facilitate a holistic, joined-up approach to implementation which is more appropriate for greening, especially where there are cross-cutting issues such as in energy, water and construction.

Transforming the national energy supply by increasing the share of renewables is essential to Jamaica's contribution to mitigating climate change, but more immediately to reducing Jamaica's dependence on imported energy sources and potentially reducing energy costs. Lower energy costs would increase Jamaica's ability to compete in international, regional and domestic markets, while increasing renewables would make Jamaica's a low carbon, and thus green, economy.

Fiscal limits are very tight for Jamaica because of the servicing of its large national debt, and the fiscal adjustments and reform to which the government is committed under the current Extended Fund Facility (EFF) with the International Monetary Fund (IMF), and beyond that, under a commitment to fiscal prudence under IMF staff monitoring. Overcoming fiscal limits will give the GoJ the capability for public investment in physical infrastructure and human resource development, in addition to providing the services needed by the poor and the vulnerable. Greening the Jamaican economy must include meeting the needs of the poor and the vulnerable, which will contribute to the social stability that attracts investors. The current commitment to tax reform provides opportunities to shift the balance of fiscal support to greening the economy. Green economic growth will increase the revenue base of the economy, and thereby ease the fiscal constraints.

This study focused on the sectors of agriculture, construction, energy, tourism and water. These sectors include the main foreign exchange earners, the largest consumers of water, and significant energy consumers, accounting for more than 22 per cent of Gross Domestic Product (GDP) and more than 33 per cent of the labour force in 2012[2]. Other sectors, while not included, are also understood to be important for greening. The study identified where the GoJ is creating enabling conditions for greening each of these sectors in the policy initiatives and plans already implemented or in the process of being drafted. It also identifies further opportunities for creating policy and programmes that will advance a green economy, taking into account the key conditions described above. The main policy recommendations for each are set out in Table 1 below.

Finally, the study assembles a programme of green public investment projects that are ongoing or soon to be implemented. The estimated potential for green growth will be much greater if private investment programmes are included.

Table 1. Elements of a strategy for greening the Jamaican economy

Overarching Themes	↘ Use resources sustainably ↘ Minimize greenhouse gas emissions ↘ Provide decent jobs ↘ Prepare for adaptation to climate change ↘ Produce low impact goods and services ↘ Incentivize green investment and disincentivize brown investment ↘ Guide public and private consumption away from harmful practices ↘ Support environmental public education and socialization
Macroeconomy	↘ Maintain stability ↘ Remove subsidies for brown activities ↘ Ease the cost of doing business ↘ Train the workforce ↘ Seek international green financing ↘ Build confidence in investors ↘ Ensure that regulations for managing environmental impacts and providing decent working conditions are relevant, transparent and easy to implement ↘ Implement green procurement by government
Agriculture	↘ Support sustainable land management ↘ Enact land reform ↘ Create improved water management systems ↘ Provide incentives for investments in green technologies ↘ Diversify energy sources ↘ Conduct research into climate resilient varieties of plants and animals ↘ Provide green agricultural extension service ↘ Create a policy framework for greening agriculture
Construction	↘ Enact the National Building Act and Enforce the New Building Code of Jamaica ↘ Adopt codes and standards that mandate green construction practices ↘ Develop a local Green Building Rating System ↘ Review and revise the existing Development Orders and other planning guidelines to reflect sustainable planning principles ↘ Provide financial incentives for the use of green building solutions ↘ Expand training programmes in sustainability related fields to ensure a sufficient supply of adequately trained workers
Energy	↘ Maintain the exemption of duties and taxes on energy efficiency and renewable energy equipment. ↘ Increase the price offered for power to the national grid under net billing ↘ Provide financial facilities for renewable energy and efficiency-enhancement projects ↘ Discourage the importation of inefficient motor vehicles ↘ Encourage energy-reducing transportation measures ↘ Implement the Energy Efficiency Building Code ↘ Promote the conservation of energy and water
Tourism	↘ Promote and incentivize renewable energy use and water use reduction ↘ Plan for sea level rise and the other impacts of climate change ↘ Develop and implement branding and marketing strategies emphasizing green elements of tourism ↘ Provide green investment incentives ↘ Promote investment in and provide incentives for small, medium and micro-enterprises ↘ Leverage public-private partnerships
Water	↘ Develop local catchment facilities ↘ Build a culture of rainwater harvesting and responsible and efficient water use ↘ Develop more extensive sewage recycling ↘ Implement cost recovery systems ↘ Reduce energy cost and diversify sources ↘ Implement a Rural Water Supply Strategy ↘ Provide sewerage services ↘ Continue to follow an Integrated Water Resources Management approach ↘ Plan for climate change adaptation

2 INTRODUCTION AND BACKGROUND

Jamaica. National boats on the Black river – © Olga&Konstantin

The project

This scoping study was produced as part of the Advancing Caribbean States' Sustainable Development through Green Economy (ACSSD-GE) project. The ACSSD-GE project seeks to implement a concept note that was endorsed by the Thirty-Seventh Special Meeting of the Council for Trade and Economic Development (COTED) from the Caribbean Community (CARICOM) on Environment and Sustainable Development[3]. The objective of the project is "to advance sustainable development by transitioning to a low carbon, resource efficient, socially inclusive green economy"[4]. The activity areas of the project are:

A. "Set up and support national and regional platforms for dialogue, research and consultation on key green economy sectors

B. Develop and present country-relevant menus of green sector investment options and supportive polices based on assessment of costs, risks and benefits

C. Help establish centers of excellence that strengthen and develop, promote and demonstrate resource efficient practices and technologies for micro, small and medium sized enterprises

D. Aid countries in setting up targets, monitoring and indicator frameworks that assess real-time progress

E. Provide training and build institutional capacity for transitioning successfully to an operational green economy, building on the sectoral expertise available in UNEP and other partners."[5]

This project also includes similar studies for Barbados, Saint Lucia and Haiti, capacity building at the University of the West Indies (UWI) as a regional Centre for Excellence in Green Economy Studies, and the formation of multi-stakeholder green economy knowledge and networking platforms for each country in the regional project.

Methodology

This study was based on secondary data sources and interviews. The secondary data sources were primarily the relevant policy documents and plans of the government, international studies on the green economy, and local media reports on the green economy and related issues. In addition to interviews with officials of the ministries with responsibility for the sectors on which this study is focused, the study benefitted from interviews with business leaders for a previous study on the green economy[6] and reports of national consultations on the green economy that were held in preparation for the United Nations Conference on Sustainable Development 'Rio+20'.

The study was guided, and several drafts reviewed, by a Green Economy Steering Committee, chaired by the Ministry of Water, Land, Environment and Climate Change (MWLECC). Drafts were also circulated to members of the Green Economy Policy Advisory Group that was constituted by the UWI. In addition, participants at a National Validation Workshop reviewed the penultimate draft of the study. The participants in the workshop were drawn from a broad cross-section of stakeholders. Finally, the study has also benefited from careful reviews by the UNEP team that has been coordinating the regional project.

Foundations of green economy policy in Jamaica

The GoJ explicitly committed to sustainable development as part of the implementation of Agenda 21, the plan that emerged from the United Nations Conference on Environment and Development (commonly referred to as the Earth Summit) in Rio de Janeiro, Brazil, in 1992. This conference was followed by the Global Conference on the Sustainable Development of Small Island Developing States (SIDS) in Barbados in 1994 that issued the Barbados Programme of Action, which has also been influential on Jamaican development policy.

The Government of Jamaica committed to the greening of the economy, along with the rest of the international community, at Rio+20. It was an extension of its commitment to sustainable development, and it is now actively engaged in the international process to build consensus around a set of Sustainable Development Goals as the focal point of a post-2015 development agenda. While these have been the main lines of the international development policy in the past two decades, there are other multilateral

Gypsum at Harbour View – © Jamaica National Environment and Planning Agency

agreements in support of sustainable development that the government has acceded to, such as the successor agreements that followed the Barbados Programme of Action in the follow-up conferences in Mauritius and Samoa, the Beijing declaration on women in development, and various multilateral environmental agreements.

These conferences and agreements have influenced policy formulation, the enactment of laws and the promulgation of regulations on waste management, energy, environmental management, tourism and other aspects of the economy that are now regarded as essential to the definition of the green economy.

Policy and legislation on the environment have been largely initiated by the Natural Resources Conservation Authority, which was established under an Act of Parliament in 1991, and began operations in the following year.

National development policy is now anchored in the long-term development plan, Vision 2030, which was published in 2009. This plan is where the first explicit national commitment to greening the economy was made. Social and economic equity are emphasized in national development plans, and constitute important dimensions in Jamaica's emerging definition of a green economy. In particular, eliminating poverty is one of the main pillars of its development policy. Vision 2030 is now being implemented through three-year rolling plans, embedded in the Medium Term Socio-Economic Policy Framework (MTSEPF).

At the 2012 United Nations Conference on Sustainable Development (commonly referred to as Rio+20), Jamaican Prime Minister Portia Simpson-Miller added her "support for the initiatives toward a green economy" while raising the question as to "whether the green economy will bring the poor into the centre of economic growth and development and improve the lives

of our citizens".[7] She expressed concern that the concept could be used as an environmental protective device in the form of "benchmarks and standards that can impose new conditionalities and barriers to trade". This caution was echoed in paragraph 58 (h) of the outcome document of Rio+20, *The Future We Want*. Such an approach would impact negatively on the social and economic conditions of small, vulnerable countries like Jamaica. The implications of this are two-fold. First, Jamaica must play an active role in international fora to guard against criteria for greening being used to restrict trade for SIDS. Second, public policy must ensure that initiatives to green the economy do not disadvantage Micro, Small and Medium Enterprises (MSME) and the livelihood strategies of the poor without providing adequate compensatory opportunities.

Three national consultations have discussed the meaning of the greening of the Jamaican economy. Two of these were convened in preparation for Rio+20 and the third as part of this GoJ-UNEP project. One of the central conclusions of these consultations was that the concept needed more clarification to reflect the realities of Jamaica's development status, process and aspirations. In the second consultation it was agreed that Jamaica needed to develop its own definition of the Green Economy that was relevant to national circumstances, taking into account the UNEP definitions being used internationally and the regional definition arising from the dialogue initiated and conducted on the Green Economy by the Caribbean National Resources Institute (CANARI).[8] Specifically, the consultation discussed the relevance to Jamaica of:

- The UNEP definition: "low carbon, resource efficient, socially inclusive"[9]; an earlier version was that a green economy "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"[10]
- The Caribbean Natural Resources Institute (CANARI) definition that sees the green economy as an approach to development and as an economy that "is pro-poor and generates decent jobs and working conditions that offer opportunities for self-advancement for local people"[11]

In 2014, the third national consultation was convened by the MWLECC[12] as part of this GoJ-UNEP project, ACSSD-GE. Two of the strongest recommendations were the need for incentives to mobilize green investments and programmes to change cultural attitudes, values and behaviour to support greening the economy.

Reducing Jamaica's carbon emissions, however marginal in global terms, is also a policy driver for greening the economy. This policy thrust will include promoting renewable energy sources. This will make up part of Jamaica's contribution to mitigating climate change, even while the country's policy emphasis must be adaptation.

This study will facilitate the clarification of the meaning of the greening of the Jamaican economy and outline a set of strategic considerations for charting an appropriate path.

3 PROFILE OF THE JAMAICAN ECONOMY

Sugar cane plantation – © Olga Khoroshunova

The Jamaican economy in 2014 is primarily a service economy, with approximately 80 per cent of GDP coming from the service sectors[13]. The principal export industries – bauxite/alumina, tourism, sugar, and bananas – are heavily based on natural resources.

Jamaica is ranked as one of the most heavily indebted countries, with a debt to GDP ratio of 130-140 per cent, and is currently completing the first year of a four-year Extended Fund Facility (EFF) agreement with the International Monetary Fund (IMF). The conditionalities for the loan are extremely stringent in the compression of public expenditure, and the expansion of government revenue, both of which tend to contract the economy. The steady and constant depreciation of the Jamaican dollar is one of the conditions that have been mandated to make the economy more competitive internationally. The response of the export sector to the anticipated increased demand has been very weak, but the impact of the depreciation on local purchasing power has been substantial.

The government has drafted a public investment programme around foreign financed public infrastructure and a proposed logistics hub to capitalize on the increased trade flows through the expanded Panama Canal. In the latter case, indications are that the project will encroach on a Convention on Wetlands (Ramsar) protected area site. This could be a major setback in the greening of the economy. On the other hand, the negative impacts could be minimized, or even offset, by appropriate conditions for the prospective investors and relevant regulations for the projected activities. Insufficient public information exists to assess either case.

Redpond bauxite waste – © Jamaica National Environment and Planning Agency

Both national consumption and production are import dependent.

Average Shares of the Import Bill for Jamaica 2009-2012	
Food and other consumption goods	29%
Raw materials for industry Energy	60% 33%
Capital goods	8%
Cars	3%

Source: Economic and Social Survey, Table 6.4, 2010-2013

The deficit on the merchandise account has been increasing over the period 2002-2013, with imports averaging 2.8 times exports. The deficit is offset by robust inflows from tourism, which have surpassed export earnings since 2009, and remittances, which are now a close second (US$ 1.7 billion) to gross inflows from tourism (US$ 2.0 billion) for 2010-2012[14].

Successive governments have struggled to stimulate economic growth to break out of the pattern of stagnation that has been reflected in the less than 1 per cent average annual growth rate for the past three and a half decades[15]. Analysts have been puzzled by the weak measured impact of robust investment flows on economic growth in recent years, and sought explanations in the growth of the unmeasured informal economy, the under-estimation of the formal economy, and the decline of productivity, especially due to high security costs, poor infrastructure, and the unfavourable external economic climate[16]. The impact of crime on the GDP was estimated as high as 3.7 per cent per annum[17] and it has been suggested that the Jamaican economy could have been 10 times larger than it is now if the growth rates of the 1960s had persisted and the crime trend that began in the 1970s had been avoided[18]. The green investment programme must draw on the lessons of the recent past in order to enhance the impact per dollar invested.

This economic stagnation has underpinned persistent poverty, together with historical inequalities in income distribution. Poverty rates declined steadily from a high of 44.6 per cent

in 1991, when the liberalization of the foreign exchange and capital markets generated an inflation rate of over 80 per cent[19], to a low of 9.9 per cent in 2007[20]. In that year, the inflation of international food prices began a reversal of the trend of declining poverty rates, which was accelerated by the global financial crisis of the following year, 2008. Six years later, in 2014, economic growth was still marginal, and the poverty rate climbed to 19.9 per cent[21]. The unemployment rate also started an upward trend in 2007, from 9.8 per cent[22] to 13.8per cent in July 2014[23].

The highest priority for building competitiveness is to reduce expenditures on petroleum supplies from the international market, which are crippling local production, transportation, and consumption. The recovery of bauxite/alumina production has been stalled partly because of the insistence of the industry on cheaper energy supplies, which is pressuring the government to concede permission for coal-fired plants. Energy and security costs for manufacturing are excessive, and compounded by low labour productivity. High energy costs limit the competitiveness of the tourism and agricultural sectors as well. Consumers complain daily on the radio talk shows about the high electricity bills that they have to pay.

Preferential access to traditional agricultural export markets has been lost as a result of the liberalization of the international trading regime associated with globalization. Furthermore, the Government of Jamaica signed the legally-binding Economic Partnership Agreement (EPA) with the European Union (EU) in 2008 for reciprocal free trade between Jamaica and the EU. Proponents of the EPA point to the new market opportunities that Jamaican exporters and service providers can potentially tap. Critics of the EPA point to the inability of Jamaican firms to compete with European firms in the short run, and the conditions of market entry, which are difficult to satisfy.

A review of the provisions of the World Trade Organization (WTO), the EPA, and the Treaty of Chaguaramas, the treaty which created the Caribbean Community, show that they all have provisions respecting national policy initiatives to protect the environment and promote sustainable development. The principle of most favoured

Burning waste – © Jamaica National Environment and Planning Agency

nation ensures that subsequent agreements, such as the Caribbean-Canada Trade Agreement (CARIBCAN) with Canada, will enjoy at least as many concessions as were granted to the EU partners under the EPA. The EPA provides for technical assistance to partners to meet the provisions of the agreement. Whether these resources will be sufficient to equip governments to make their cases in the interest of protecting the environment from trade and investment threats remains to be seen.

Bauxite/alumina's several decades of growth has become constrained by high imported energy prices. At rates varying from 29 to 42 US cents per kWh for different classes of users, and in particular, 31 US cents per kWh for industrial users[24], Jamaica is hard-pressed to develop competitive manufacturing industries.

Tourism has been Jamaica's most successful industry in the competition for international markets. As traditional Caribbean export markets disappear with the loss of preferences, all of the countries of the wider region are turning to tourism as the principal foreign exchange earner and economic driver. This intense competition will intensify as restrictions on USA citizens traveling to Cuba are further eased. Competition will require the Jamaican tourism industry to enhance its efficiencies continuously, partly by reducing costs, such as energy, and partly by differentiating its offerings to meet the changing demand of the international market. Tourists are demanding cleaner and healthier environments, which is perhaps the most important driver for the greening of that industry.

Pre-revolutionary Cuba was the main hotel destination in the Caribbean, and today Cuba has a wide variety of attractions on offer. It can compete with the rest of the region for the standard offering of beach tourism, and can offer a broad range of education and cultural services specific to its own historical experiences.

Traditional import and export market conditions have been radically altered by the ongoing process of globalization. The prices of energy and food, two of the most important imports in the country, are unstable and often very high. In the long term they are expected to increase due to scarcity, increasing demand, and extreme weather events. The obverses of these factors are the opportunities created for the replacement of imports by tapping indigenous energy resources and expanding food production for both the domestic and export markets. With the loss of preferential access to traditional markets, agriculture has been adjusting its outputs to take advantage of the new international and national market opportunities.

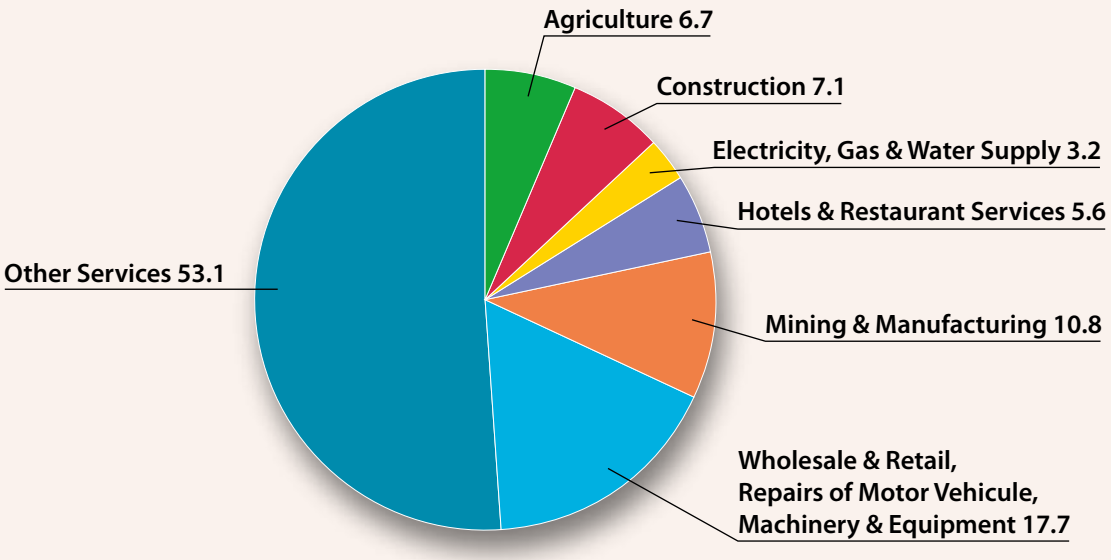
Rising housing costs present increasing challenges for the growing deficit in the supply of low-income housing. The squeeze on profits from rising input costs and limited purchasing power at the low end of the market has prompted initiatives toward more efficient construction techniques, greater efficiencies in the government's approval processes, and adaptations of homeowners' preferences to more affordable solutions.

Environmental profile of the economy

Bauxite mining is a major industry in Jamaica. It removes the topsoil to get to the ore, and deposits the caustic soda-rich waste from processing the ore into huge mud lakes that leak through the porous limestone formations into underground aquifers. The bauxite/alumina sector as a whole consumed 16 per cent of total oil imports in 2013. This may increase as the sector tries to recover from the economic crisis of 2008, given that its share of oil import consumption was as high as 35 per cent in 2004 when the industry was operating at near full capacity.

Tourism is another major economic driver. Tourists are accommodated in hotels sited primarily on the beaches and entertained on the same beaches as well as at other environmentally-based attractions, such as Dunns River Falls and Mystic Mountain in Ocho Rios. The sector is a major consumer of imported energy for transport, electricity, and water.

Figure 1. Percentage contribution to GDP by industry at constant (2007) prices, 2013



Source: Planning Institute of Jamaica (PIOJ), Economic and Social Survey of Jamaica (ESSJ), 2013

Several other sectors such as manufacturing, construction, and water also use significant quantities of imported energy.

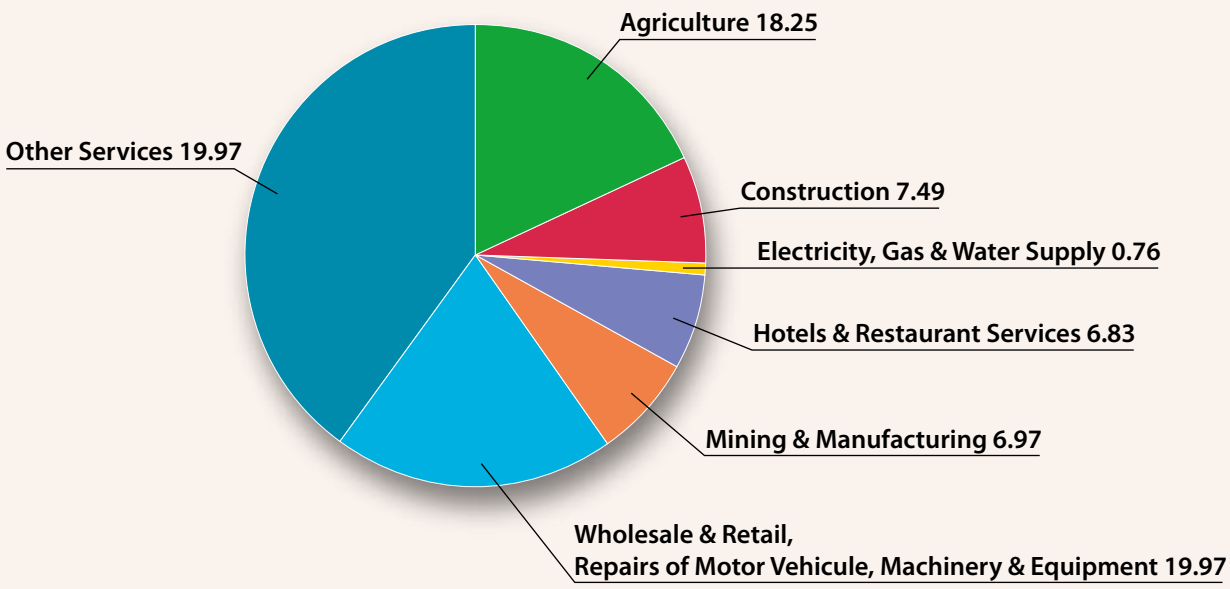
The agricultural sector generates about 75 per cent[25] of water demand annually, most of which is used for the irrigation of sugar cane and other export crops. Historically, export agriculture was sited in the coastal zones to facilitate trade. Today it is still primarily located in the coastal zones, which are vulnerable to the impact of the chemical inputs and groundwater extraction on which the sector depends.

Domestic agriculture has traditionally been based in the hills where ex-slaves settled after emancipation. Cultivation in the hills has contributed to deforestation, and the use of steep slopes has led to soil erosion. Over-extraction degrades watersheds, while climate change contributes to reduced rainfall, and the denuded hillsides facilitate flooding when rain does fall. Domestic agriculture uses imported energy and chemicals, but less intensively than export agriculture. It also uses charcoal made from burning wood from local trees in earthen kilns.

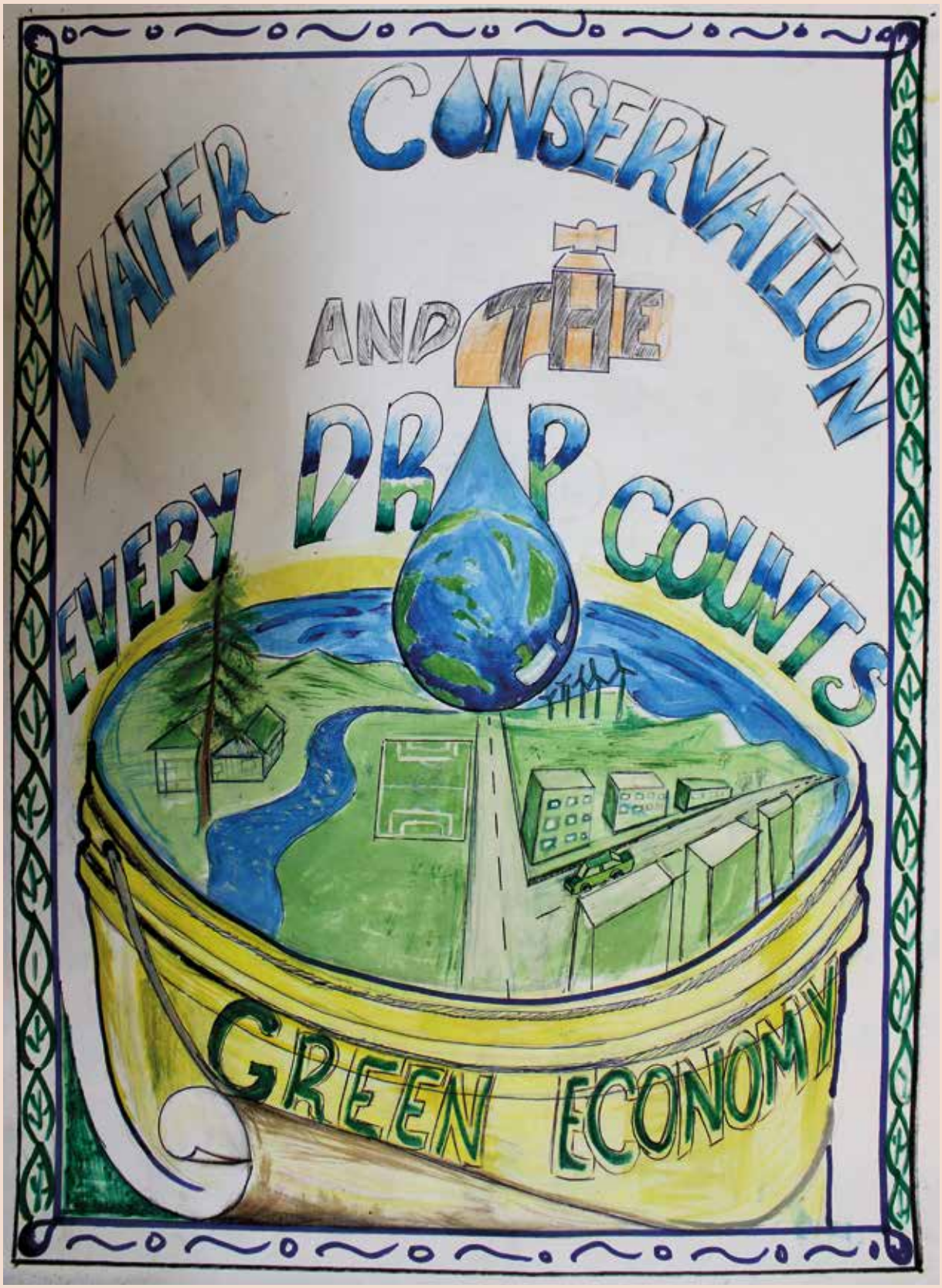
Household consumption of energy and water, and the disposal of waste need to be highlighted for attention in the greening of the economy. Sales of electricity to residences accounted for 33 per cent[26] of the total sales by the Jamaica Public Service Company (JPS), the sole provider of electricity, in 2011. In 2007, the Planning Institute of Jamaica (PIOJ) estimated that residences generated 70 per cent[27] of solid waste in the country.

The selected sectors for this study include agriculture and tourism, two of the main foreign exchange earners, energy, the largest component of the import bill, and water, one of the largest consumers of electricity. Together, the selected sectors accounted for more than 22.8 per cent of GDP, more than 33 per cent of the employed labour force in 2012, more than 75 per cent of water consumption, and a significant share of energy consumption.[28] Three of them – energy, water, and construction – cut across all the other sectors as well. Figures 1 and 2 present the sectoral profiles of the GDP and the employed labour force respectively.

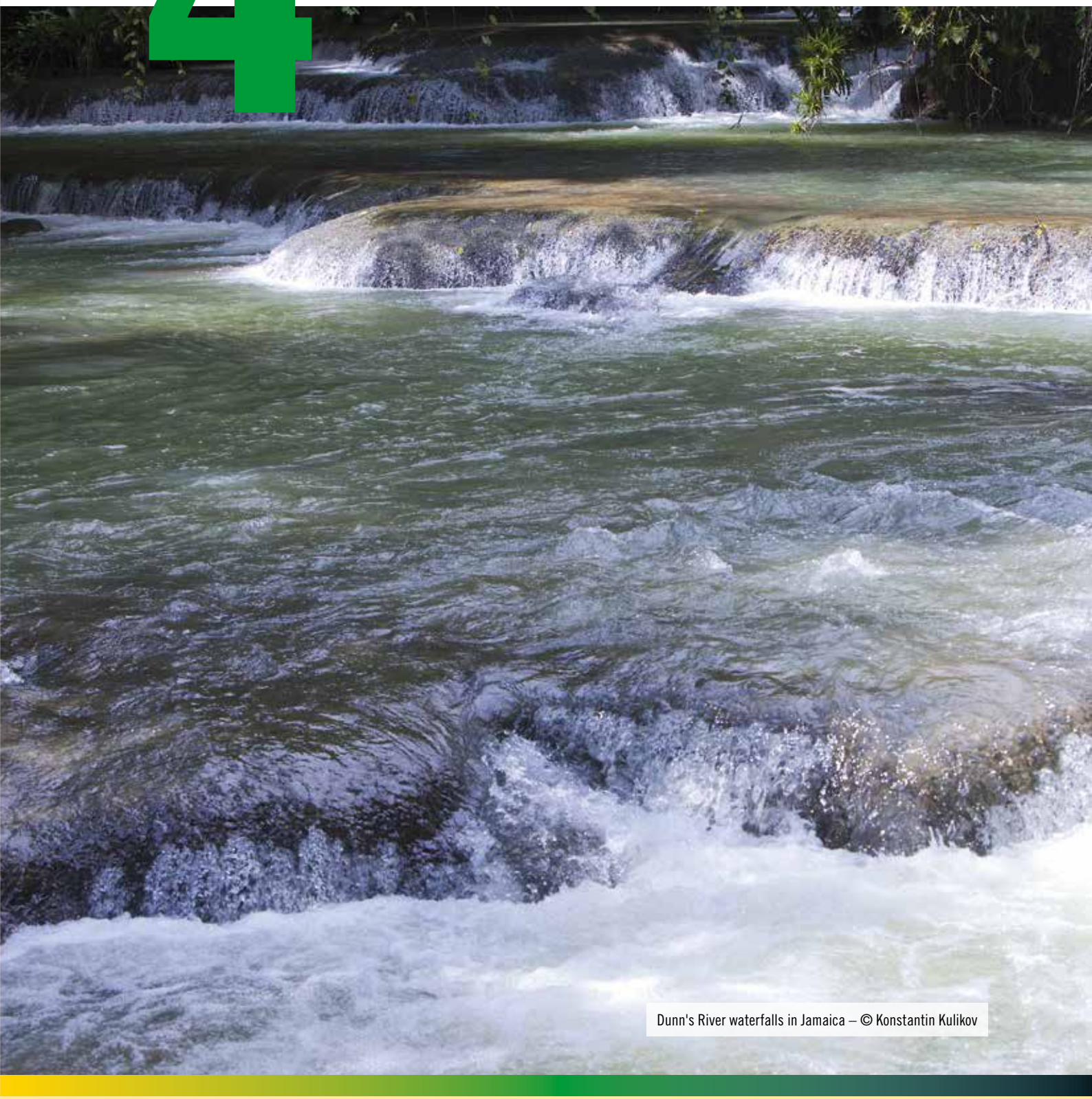
Figure 2: Employed labour force by industry, %, 2013



Source: Statistical Institute of Jamaica (STATIN), The Labour Force Survey, 2013


WATER CONSERVATION
AND THE
EVERY DROP COUNTS
GREEN ECONOMY

4 GREENING THE JAMAICAN ECONOMY



Dunn's River waterfalls in Jamaica – © Konstantin Kulikov

Vision 2030, Jamaica's long-term development plan, has posited the goal of achieving developed country status by 2030, so that Jamaica will be "the place of choice to live, work, raise families and do business". The path to this goal requires the economy to grow faster than the annual average (0.5 per cent) for the past 50 years, with low environmental impact, to provide income-generating opportunities for full employment, to be more inclusive than it has been, and to achieve and maintain international competitiveness. Vision 2030 posited the greening of the economy as one of its central strategies: "By basing new jobs and industries on sustainable use of natural resources and unique environmental assets (for example by developing renewable energy sources, promoting organic agriculture or exploring the genetic potential of our endemic species), Vision 2030 Jamaica will help to build a Green Economy".[29]

In the public consultations on the green economy, a strongly supported view was that greening the economy should be seen as a method of pursuing sustainable development, which is something to which the government of Jamaica has long been committed. The environmental dimension of sustainable development requires the management of natural resources for efficient and sustainable use. The principal natural resources of concern in Jamaica are water, land, forests (terrestrial and marine), and beaches. The management needs to be all the more dynamic given the accelerating changes in the climate. Greening the Jamaican economy must entail the management of these resources for sustainability. In a market economy, an appropriate balance between regulation and pricing will guide the use of the resources. This balance will not easily be struck against a tradition of free or low-cost use of resources, and this balance will change over time.

The historical and political context in Jamaica has created several conditions that are obstacles to and reasons for greening the economy:

- Historical momentum in favour of traditional brown industries
- The predisposition of the governance structure to actions on sectoral issues as opposed to joined-up approaches to cross-cutting issues,
- Bias in the political system toward short-run and against long-run perspectives
- The burden of the national debt that limits the government's fiscal space, and
- The enormity of the social and economic needs of the poor and the vulnerable

Greening Jamaica's economy will entail engaging a range of cross-cutting issues, such as poverty and equity, environment and climate change, and gender and youth, which have to be mainstreamed in public policy. The GoJ will have to intensify its efforts toward joined-up government that takes a holistic approach to policy issues with agencies and institutions that are more agile and responsive to the challenges of adjustment.

Economic growth is driven by investment in the context of favourable international economic circumstances, adequate preparation for extreme weather events, a stable macro-economy, a population with expanding human capabilities, social stability, and an agile, efficient system of governance institutions.

Building resilience to economic and environmental shocks

Like other SIDS, Jamaica is vulnerable to shocks from sudden unfavourable changes in import and export prices, investment flows, and in general, changes in trade conditions that increase costs and/or restrict access to international markets. Diversifying trade and investment relations are essential risk management strategies for building resilience to shocks from the international economy. Initiatives are underway to cultivate trade relations with the BRICS (Brazil, Russia, India, China and South Africa) and the South American economies, while maintaining ongoing relations with North America and Europe. In recent years, trade and investment relations with Brazil and China have been strengthened and Chinese state and private investment now constitutes a major share of foreign investment. It would be wise to maintain a balance of relations among partners, and not repeat the historical pattern of dependence on one major partner.

One of the priorities agreed at the third international conference on SIDS in Samoa

Jamaica. Tropical nature. Nassau Valley – © Konstantin Kulikov

in 2014 was to re-emphasize partnerships for sustainable development. Jamaica is committed to these, and in this context SIDS-SIDS partnerships are important components of broadening international relations.

In the case of hazards, resilience depends on both preparations to minimize the impacts of extreme events, as well as strategies to maximize the speed and minimize the cost of recovery. Jamaica is particularly vulnerable to hurricanes and earthquakes. While preparation for hurricanes is now highly developed, recovery from the impact is still slow, and therefore, costly in terms of lost production. Partnerships between the GoJ, the telecommunications companies, and the media are critical elements in preparedness. The infrequency of earthquakes has led to public complacency, despite the high risk, given that Jamaica is on the same geological fault line as Port-au-Prince in Haiti. Advice from a visiting seismic expert in 2013, sponsored by the UNDP[30] re-focused attention of policymakers, but much more needs to be done by the Office of Disaster Preparedness and Emergency Management (ODPEM) to build the same kind of awareness in the public as they have for hurricanes.

Of course, while these are the two main hazards that have the potential for disasters, climate change has already manifested itself in prolonged and severe droughts alternating with intense rainfall that often leads to flooding. Both of these events impact the national food supply and, by extension, food security. Because food makes up a large share of consumption expenditure in Jamaica, restrictions in the food supply generate inflationary pressures that undermine macroeconomic stability, and in particular, lead to the depreciation of the Jamaican dollar. Management of water at the level of individual households and farms as well as at the community level must, therefore, be a high priority on the policy agenda to smooth out the effects of

changes in traditional precipitation patterns on the food supply.

Promoting investments for green and inclusive growth

The GoJ promotes investments both internationally and locally to stimulate economic growth. Greening the economy entails shifting the investment focus toward economic activities that use natural resources sustainably and are structured to include training and developing the labour force to enhance productivity, as well as fostering linkages with Micro, Small and Medium Enterprises (MSME). Ideally these investments will also result in increased public revenue, enabling the government and its partners to address the social needs of poor and vulnerable populations.

This is a big challenge for Jamaica, because of its traditional dependence on low-wage labour and natural resource-intensive export industries, namely, agricultural exports, mineral exports, and beach-based tourism. On the other hand, Jamaica has become a service economy, with services accounting for about 80% per cent of GDP. Apart from tourism, the services depend primarily on energy and human resources, but some of these services and household consumption generate a lot of waste.

Historically, the GoJ offered fiscal incentives to attract foreign investment. A principal reform agreed with the IMF as a condition for the current EFF is the near- elimination of the incentive schemes. Similarly, discrimination in favour of local investors is not permitted under WTO rules. New ways of guiding investors into preferred areas, such as green investments, will have to be found. Certainly, reducing the cost of establishing a business, reducing the cost of energy and security in particular, and improving the productivity of labour are ways of enhancing the profitability of investments. However, these improvements will benefit all types of investments. At some point, the GoJ will have to enact regulations that protect the natural environment and encourage business activities that include MSME and offer decent work to employees. Among the actions listed in the SAMOA Pathway for SIDS governments are:

- "Fostering entrepreneurship and innovation, building capacity and increasing the competitiveness and social entrepreneurship of micro, small and medium-sized enterprises and State-owned enterprises…as well as encouraging inclusive and sustainable industrial development with the participation of all people, including the poor, women, youth, and persons with disabilities

- Creating local decent jobs through private and public projects and encouraging entrepreneurs to start up environmentally sound businesses through adequate and appropriate incentives"[31]

The jobs that are created should contribute to preserving or restoring environmental quality and should offer decent work, as defined by the International Labour Organization (ILO).

Desperate for economic growth to end secular stagnation, governments are often tempted to trade off sustainability and quality employment for immediate and short-run boosts to GDP and employment. A menu of green investment projects ranging from the immediately implementable to the medium and long-run will give policymakers more options for investment promotion. The next section looks at the incipient greening initiatives in tourism, agriculture, and construction, the sectors most likely to drive green growth in Jamaica. Other potential drivers are the cultural industries such as music, film, sport, and exotic foods, and offshore services in education, health, and information and communication technology.

Overcoming fiscal limits

The limited fiscal space left after debt service makes it imperative for the government to increase administrative efficiency, so as to get more from each dollar of public expenditure. The current EFF seeks to eliminate the fiscal deficit rapidly – within 3 years – by increasing revenues and cutting public expenditure. These measures limit the government's ability to facilitate private investment with complementary public investment in infrastructure and to provide the poor and the vulnerable population with much needed services. To achieve key goals in a context of reduced public expenditure, the government must innovate with administrative processes that make the government flexible and agile. The need for

partnerships with the private sector and civil society is inescapable.

There are several areas key to advancing a green economy which require government attention. One area requiring urgent attention is the reform of the formal education and training system with a view to increasing the productivity and work-readiness of the workforce. Another challenge is to maintain social stability in the face of widespread resentment of a historical legacy of injustice and social prejudice and years of economic stagnation and austerity. These conditions have created fertile ground for an informal economy, with informal structures of governance. They also have generated social indiscipline which ranges from anti-social behaviour in public spaces through poor work ethic in the workplace to crime and violence presenting enduring challenges to security.

The current EFF departed from previous agreements by establishing a floor for public expenditure on the main programme for social protection, the Programme for Advancement through Health and Education (PATH) programme. However, the benefits are quite small, and the coverage of the programme is far less than the social needs.

The GoJ will have to broaden and deepen its partnerships with international development partners on the one hand and empower community organizations on the other to mobilize resources and voluntary efforts to address the social needs. Some of the more pressing issues are:

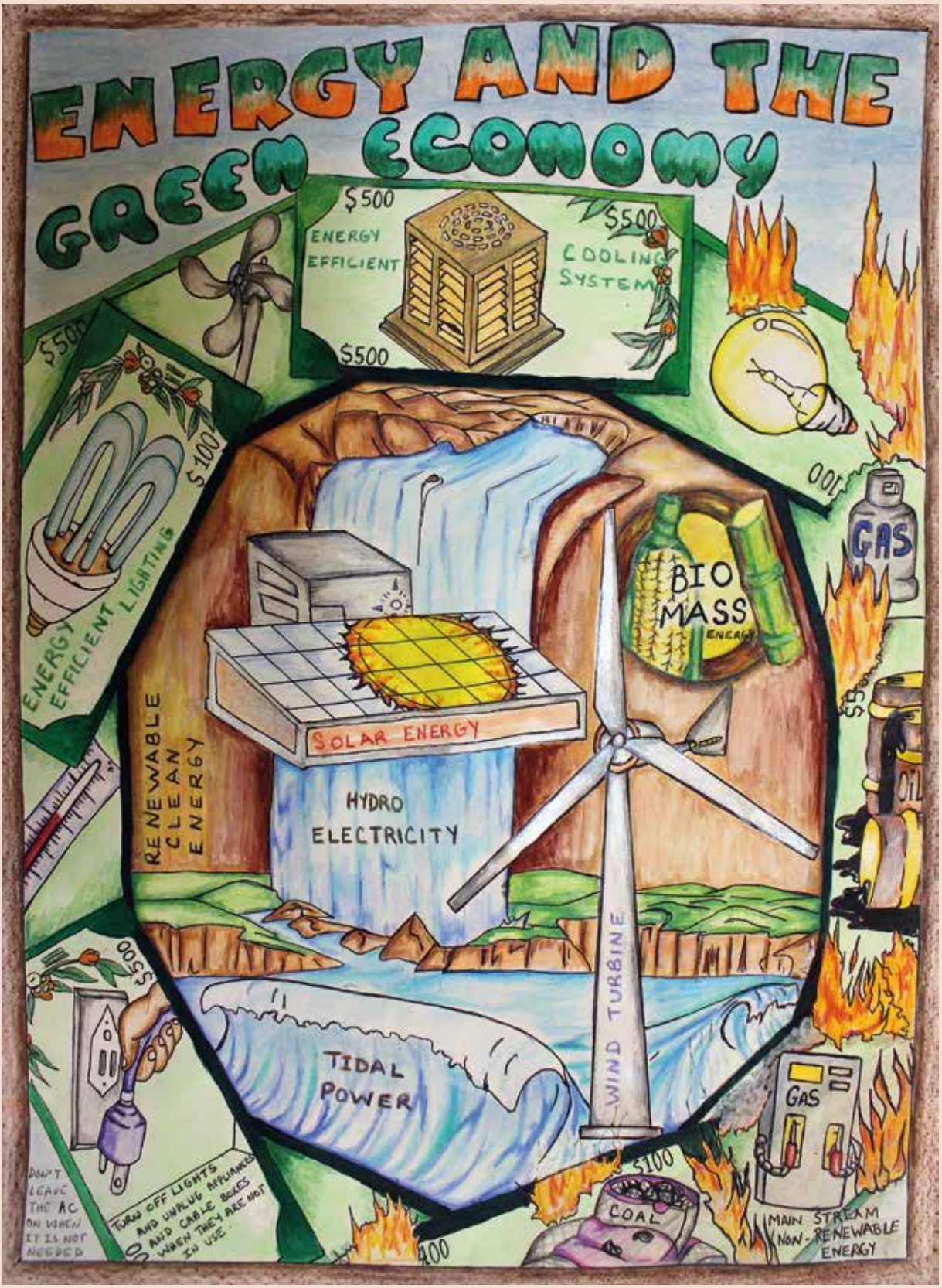
- Eradicating, or at least minimizing, the poverty rate
- Combating HIV/AIDS, and preparing to manage the impact of communicable disease outbreaks, as well as managing non-communicable diseases, which are the leading causes of mortality
- Reducing crime and violence
- Reforming the justice system
- Addressing gender imbalances, including the tendency for male underachievement

Vervain humming bird – © Jamaica National Environment and Planning Agency

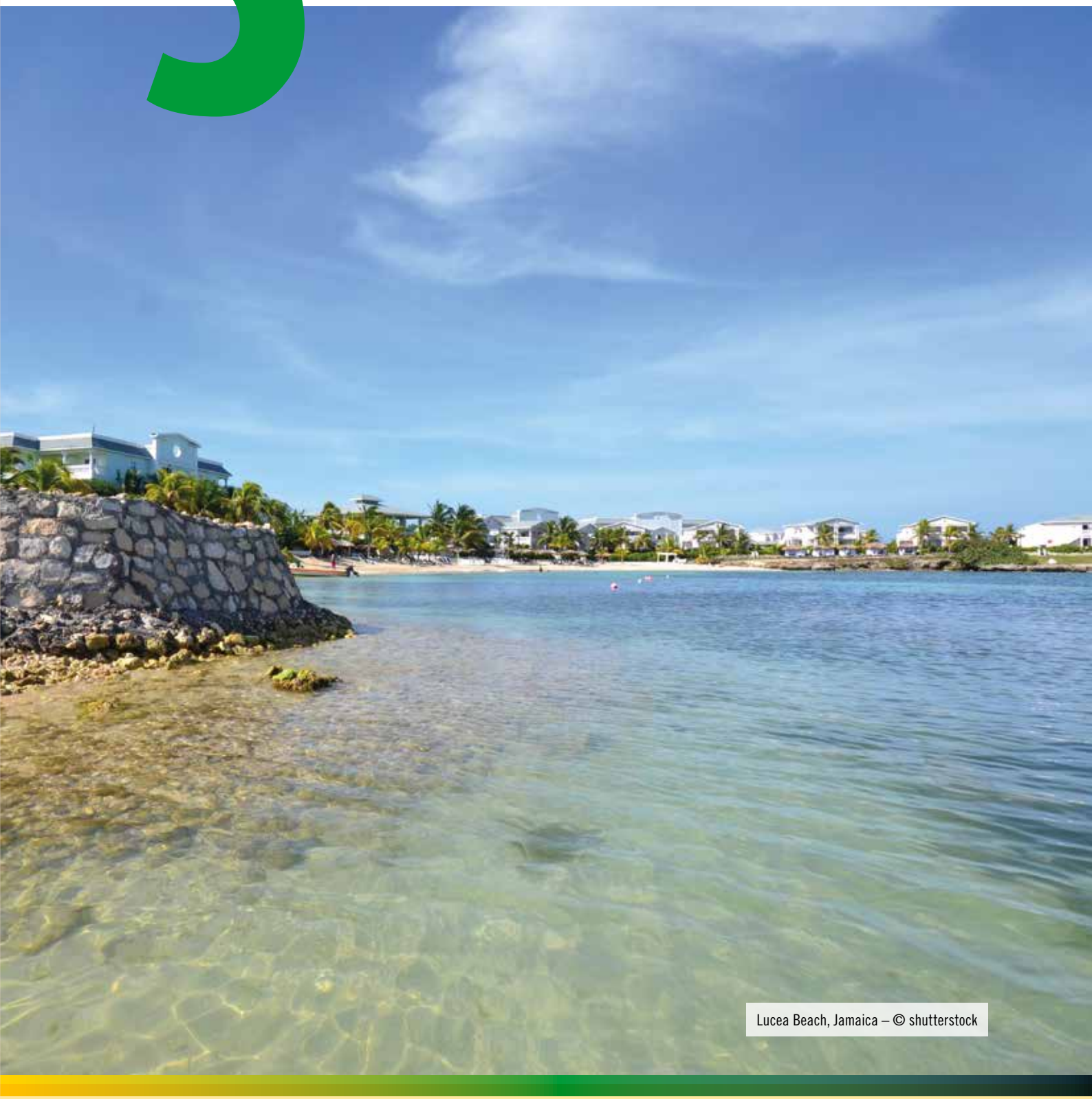
Social stability is essential for economic growth, and maintaining it will entail promoting both economic and social inclusiveness.

A principal element of the current EFF is to reform the tax system with a view to increasing revenue. Two strategies to achieve this are to drastically reduce subsidies and to eliminate tax evasion. Beyond these, greening the economy will benefit from tax measures on activities that have a high impact on the environment under the principle of the "polluter pays".

As Jamaica grows its formal economy, greater tax revenue will be generated, easing fiscal limits. Additionally, by developing more efficient service delivery systems as a result of the austerity of the adjustment programme with the IMF, increased revenues will enable more impactful approaches to addressing social needs in the future.


ENERGY AND THE GREEN ECONOMY
$500
ENERGY EFFICIENT
$500
COOLING SYSTEM
$500
$50
$100
ENERGY EFFICIENT LIGHTING
100
GAS
BIO MASS
ENERGY
SOLAR ENERGY
RENEWABLE CLEAN ENERGY
HYDRO ELECTRICITY
WIND TURBINE
OIL
$500
TIDAL POWER
DON'T LEAVE THE AC ON WHEN IT IS NOT NEEDED
TURN OFF LIGHTS AND UNPLUG APPLIANCES AND CABLE BOXES WHEN THEY ARE NOT IN USE
$100
COAL
400
GAS
MAIN STREAM NON-RENEWABLE ENERGY

5 SECTORAL ANALYSIS



Lucea Beach, Jamaica – © shutterstock

This study has focused on the sectors of agriculture, construction, energy, tourism and water. These sectors include the main foreign exchange earners, the largest consumers of water, significant energy consumers, and accounted for more than 22 per cent of GDP and more than 33 per cent of the labour force in 2012. The study of each of these sectors was undertaken by a national sector specialist working in conjunction with the relevant Ministry. Analysis has focused on data from 2002-2013, in order to capture information on the sectors before and after the economic crisis of 2008.

Agriculture, Fishing, and Forestry

In both the National Income Accounts and the Labour Force Surveys, "agriculture" refers to crop and livestock production, fishing, hunting, and forestry. Hunting is informal and estimated to be marginal. While fishing and forestry also are marginal contributors to GDP, they are important for employment and livelihood strategies in areas where the incidence of poverty is relatively high. This study will use this broad definition of agriculture.

Crop and livestock production

Despite agriculture's declining share of Jamaica's GDP in recent decades, it averaged 5.9 per cent of GDP annually between 2002 and 2013, and grew at an annual average of 1 per cent for the period, which was twice the 0.5 per cent average annual growth rate of the economy as a whole[32]. Investment in agricultural machinery and equipment was a marginal, 0.7 per cent, share of national investment, and the sector's share of total credit was only 2.0 per cent on average in each year of the period under review. Agriculture accounted for an annual average of 18.9 per cent[33] of the total national employment for the same period, and continues to earn a small but significant share of foreign exchange. In 2008, the employed labour force in agriculture was 217,000[34]. Agricultural commodities earned US$ 20 million, a little more than 1 per cent of earnings from the exports of goods in 2012. Strictly speaking, sugar is a manufactured commodity, based on the agricultural commodity, sugar cane. In 2012, sugar earned US$ 94.1 million, or 5.4 per cent of the total earnings from exports of goods[35].

Crop and livestock production traditionally have had a dual structure, consisting of a subsector of large and medium-sized commercial farms using wage labour to produce primarily for export, and a subsector of a large number of small farmers producing primarily for domestic consumption, the majority (approximately 85.6 per cent) of whom operate on holdings averaging less than 2 hectares with the assistance of family labour and occasional wage labour. The domestic subsector utilizes traditional farming methods – typically labour intensive and rain-fed systems[36].

In 2014, the Water Resources Authority[37] estimated that at present, agriculture generates 75 per cent of the water demand in the country. Most of this is used for irrigation by the commercial sub-sector, which accounts for a little over 9 per cent[38] of the cultivated farmland. The sector uses synthetic chemicals, such as fertilizers, fungicides, and herbicides, some of which run off into the streams and rivers, ending up eventually in the coastal zones. Historically, agriculture has competed with the forests for land, but more recently agriculture has been losing land to housing, roads, and various other commercial activities.

The sector has begun to diversify its energy sources. The sector has begun to produce biofuels for its own use, as well as for sale to other domestic sectors and export through the production of ethanol. Similarly, the sugar factories have long used bagasse from crushed cane as own sources of energy. There are plans to expand this practice.

Fishing

Fish stocks have been depleted by unsustainable fishing practices including small diameter mesh sizes for traps and nets, dynamiting, and compressor-supported spear fishing. The degradation of coral reefs around Jamaica by bleaching from warming acidic waters, land-based pollution, diseases, and destructive fishing practices (e.g. dynamiting) is a major policy concern for the management of coastal resources. This and other loss of habitat from human destruction and climate change have impacted negatively on fish stocks The Jamaica National Environmental Action Plan,

2006-2009, noted that "Current levels of coral cover contrast with the situation in the 1970s. In the late 1970s, nine (9) reefs on the north coast had live coral cover averaging 52 per cent at 10m depth, but this declined to 3 per cent in the 1990s. Measurements by the UWI Centre for Marine Sciences of fifteen (15) sites in 2005, recorded live coral cover ranging between 0 and 34.38 per cent. While the situation has improved since the 1990s, the island's reefs still remain under threat."[39]

In 2008, there were over 18,000 registered fishers, many of whom were employed only part-time. 94 per cent of the registered fishers were male and 46 per cent of these males had no more than a primary education[40].

Forestry

With regard to the terrestrial forests, "About 30 per cent of Jamaica, approximately 336,000 hectares, is classified as forest."[41] The majority of forest land has been disturbed and degraded, and only about 8 per cent of the island remains as natural forest showing little evidence of human disturbance. Approximately 110,000 hectares of land are designated as forest reserves, but over one-third of forests in reserves or other protected areas have been significantly disturbed by human encroachment."[42]

One new frontier in the forestry sector is the potential to grow fuel wood and to produce charcoal sustainably. Over the past several decades, much thought has been given to and some research has been done on fast-growing trees. The results from a pilot plot on the Leucaena plant identified several promising varieties which would become economically feasible if oil prices increase.[43] A challenge of charcoal production is that it can encroach on forest reserves if it is not sustainably managed.

While fishing and forestry provide subsistence livelihoods for many people, together they account for less than 1 per cent of GDP.[44]

Summary

Table 2 summarizes indicators of the role of the agriculture in the national economy.

Table 2. Agriculture in the National Economy – 2002-2013

Agriculture – average for 2002-2013, as % of:	%
GDP	5.9
National Investment	0.7
Credit	2.0
Employment	18.9
Exports	1.0
Average Annual Growth. Rate, 2002-2013, %	
Total GDP	0.5
Agriculture GDP	1.0
Sugar as a % of Exports in 2012	5.4

Source: PIOJ, ESSJ, annual

Agriculture, in this broad sense defined above, has the potential to shape a wide range of issues that are intrinsically linked, and extremely vital for transitioning to a green economy, including: food security, poverty eradication, biodiversity, human health, the efficient use of natural resources, rural growth and development, and energy consumption. It is now well accepted that in order for Jamaica to achieve Developed Country Status by 2030, there needs to be a drive not only to reduce rural poverty, but to also promote and stimulate rural economic growth and increase Jamaica's overall competitiveness. Given the importance of agriculture to Jamaica's economy in general, and the central (and potential) role the sector plays in sustaining rural livelihoods in particular, any meaningful attempt to improve the lives of the rural poor must depend critically on the growth and development of the sector's commercial activities, including the processing of primary products in agro-industries.

There is mounting evidence to suggest that investing in sustainable forms of agricultural production involves a wide range of viable alternatives to existing farming practices. Sustainable crop and livestock production systems offer a large number of benefits including the supply of essential life-supporting ecosystem services while addressing problems such as environmental degradation, vulnerability to climate change, livelihood insecurity, and poverty.[45] The depletion of fish stocks due to

unsustainable fishing practices can be reversed with appropriate regulations and the creation of sanctuaries, as Belize has shown[46]. Initial results in Jamaican sanctuaries[47] are promising. Similarly, the Forestry Department's strategy for co-management of the forests by local forest managing committees, launched in 2000[48], has had some early successes[49] in protecting forests from illegal logging as well as generating social and infrastructural developments in some of the communities that live near the forests. Greening Jamaica's agricultural sector can embody an approach to development that seeks to move beyond just simply minimizing the negative impacts on the natural environment from conventional farming practices. It should also facilitate the transition towards new jobs and industries based strongly on principles of social equity and justice, market competitiveness, and the sustainable use of natural assets and resources. In this way, agriculture will contribute to the campaign against poverty, instead of being a part of the basis of rural poverty.

However, Jamaica's ability to transition effectively to a green economy path is contingent on addressing a number of existing internal systemic constraints and external risk factors that could seriously derail any attempts to transform the agriculture sector. Chief among these challenges for greening the agriculture sector are:

- Limited knowledge and technical capacity pertaining to green agriculture
- Reliance on fossil fuel by the agriculture sector (especially for rearing livestock, production of large-scale commercial crops such as banana and sugarcane, and hydrocarbons used in synthetic pesticides, herbicides, and fertilizers which impact the environment negatively)
- Lack of adequate incentives in the current policy environment for greening the agriculture sector. Existing tax concessions and subsidies tend to favour brown rather than green economic activities
- Limited fiscal space available to the government after servicing the national debt to fund infrastructural and technical support for green growth activities. Between 2007/8 and 2012/3, agriculture received an average of 1.7 per cent of recurrent and capital expenditure
- Traditional cultural practices and attitudes of ageing local farmers and agri-business operators who may not readily adapt to and embrace green economy initiatives
- Inequitable land tenure patterns and farm fragmentation that limits innovation and economies of scale
- Agriculture's exposure, sensitivity and overall vulnerability to a range of natural hazards including hurricanes, floods, droughts and landslides, all of which are affected by climate change and variability
- Competition from cheap imports

Existing enabling policies and programs

Agriculture in Jamaica benefits from a wide range of policy initiatives, primarily aimed at enhancing the sector's competitiveness and drive towards a sustainable development path. Chief among these are the Vision 2030 Agriculture Sector Plan (2009) and the National Land Policy (1996). Some of the new policies that have been submitted for Cabinet approval are the Food and Nutrition Security Policy, the Food Safety Policy, and the Plant Health Policy. There are also important policy papers that are awaiting approval by Cabinet, such as the Animal Health Policy, the National Organic Policy, the Agricultural Land Utilisation Policy, and the Sustainable Land Management Policy.

There have also been a number of recent programmes geared toward resuscitating and improving production in certain key subsectors in the industry such as ginger, Irish potato, onion, banana, coffee, cocoa and turmeric. Other programmes have centred more generally on issues related to environmental sustainability, infrastructural development (with an emphasis on irrigation, greenhouse production and improving post-harvest care), marketing, agro-processing, livelihood security and disaster risk management. To date, some gains have been made in boosting production in key crops such as Irish potato, cocoa and ginger and in terms of infrastructural development and technology

Box 1.
Green opportunities for agriculture

Several key opportunities for greening the country's agriculture sector were identified by stakeholders during this study. These projects will require the support of research and development and adoption of green technologies, improved agricultural extension, and increased access to agricultural credit and insurance for greening services. These opportunities include:

1. **Restructuring the sugar cane subsector** This sector has the potential to significantly contribute to the generation of clean energy from bagasse. Technical assistance may be required to examine the institutional/regulatory arrangements to support the development of energy/electricity cogeneration in the subsector and also to conduct feasibility studies for individual sugar estates to explore power generation at their plants.

2. **Promoting organic agriculture** A major goal of the National Organic Policy is to promote the development of a sustainable, locally and internationally competitive organic agriculture subsector that protects the environment and enhances biodiversity, human health, and contributes to national food and nutrition security, job creation, economic growth and social equity. There is already an active, but small association of organic farmers in Jamaica. The Jamaica Organic Agriculture Movement (JOAM) is a not-for-profit organization created to promote and facilitate the development of a sustainable and economically viable organic agriculture sector in Jamaica.

3. **Exploring new niche market opportunities** These include alternative trade networks such as Fair Trade (especially in the production of bananas, cocoa and coffee). A core principle in the Fair Trade standards is that producers should be organized in small producer organizations and required to operate in a democratic, transparent, and non-discriminative manner with an overarching aim to protect the natural environment. Pursuing these market opportunities could support the greening process.

4. **Building resilience to climate change** This can be developed through the introduction of new and cost-effective climate-smart technologies and practices such as rainwater harvesting and solar-smart irrigation systems. These activities could also positively contribute towards a green economy transition. The Ministry of Agriculture is proposing a pilot project aimed at introducing an automated climate-smart irrigation system using solar power that could significantly reduce energy costs within the agriculture sector, while optimizing the use of water for irrigating purposes.

5. **Identifying and building on traditional good practices** These include mulching, composting and free-range livestock farming practices that are consistent with greening. There are a variety of low-cost training methods such as the Farmer Field School programme currently being piloted by the U.S. based organization ACDI/VOCA (supported by USAID) that could be used to build farmers' knowledge and awareness about these and other sustainable farming practices.

transfer, especially as it pertains to the setting up of irrigation schemes and the increased adoption of greenhouse technology. However, by and large, the sector still suffers from a wide range of stress and shock factors, which could seriously undermine the productivity and competitiveness of Jamaica's agriculture industry.

Table 3 provides a summary of a few of the agricultural programmes in Jamaica.

Table 3. Past and ongoing intervention programmes involving the Ministry of Agriculture and/or Rural Agricultural Development Authority (RADA)

Project Title	Description
GoJ/Adaptation Fund: Enhancing the Resilience of the Agriculture Sector and Coastal Areas to Protect Livelihoods and Improve Food Security	This programme seeks to protect the livelihoods and food security of people living in seven parishes (Westmoreland, Manchester, Clarendon, Saint Mary, Saint Ann, Trelawny and Saint Thomas) as well as to enhance the climate resilience of the agricultural sector through improving water and land management practices via water storage, soil conservation, building micro-dams, small-scale irrigation, and other initiatives. Adaptation Fund (Status: ongoing).
Strengthening Community Preparedness & Resilience to Natural Disasters in Selected Vulnerable Areas in Jamaica	Involved participatory baseline assessments for 5 selected vulnerable communities, namely Rocky Point, New Market, Hall's Delight, Cascade and Old Harbour Bay. Agriculture Disaster Risk Management (ADRM) Plans were also prepared for the five communities. Funded by the Belgian Government and FAO (Status: completed)
Rainwater Harvesting Project	Aimed to significantly increase production of local foods through improving the water harvesting capabilities of farmers. A pilot project funded jointly by the FAO and the EU has been completed, and a second phase is being planned.
Economic Diversification Programmes for Banana Producing Parishes	Provided financial and technical assistance to small-scale farmers in traditional banana producing parishes to diversify into new crops as well as livestock. Also provided selected farmers with the materials, training and technical support necessary to engage in sustainable production of Scotch Bonnet Peppers, goat rearing and apiculture. Programme involved partnership between the EU Banana Support Programme, RADA/Ministry of Agriculture and Fisheries and Food For the Poor. (Status: completed).

Construction

The contribution of the construction industry to GDP has averaged 7.7 per cent annually over the period 2002-2013, growing at an annual average of 0.1 per cent, less than the 0.5 per cent rate of growth for the economy as a whole. The sector contracted severely in the crisis years of 2008 and 2009, and has yet to recover. Historically, the construction sector has been a major driver for the growth of the national economy. The sector accounted for almost half, 46.9 per cent, of total annual investment in the period under review. The impact of green investments in this sector will therefore be far-reaching, since it accounts for such a great share of investment and cuts across all other sectors. Construction is also an important employer of skilled and unskilled labour, with an annual average share of total employment of 8.9 per cent for the same period. The sector is generally divided into two subsectors for analytical purposes, residential and non-residential construction, the latter being comprised of commercial, institutional, hotel/resort building and infrastructure installations that are related to both utilities and transportation. Table 4 summarizes indicators of the role of the sector in the national economy.

Green construction refers to the process of creating, in a resource efficient manner, infrastructure or buildings that have low environmental impact throughout their total life cycles, from siting to design, operation,

Table 4. Construction in the national economy 2002-2013

Construction – annual average for 2002-2013, as % of:	%
GDP	7.7
National Investment	46.9
Employment	8.9
Average Annual Growth. Rate, 2002-2013, %	
Total GDP	0.5
Construction GDP	0.1

Source: PIOJ, ESSJ, annual

and maintenance, and in compliance with the criteria of independent green building standards. Some examples are Leadership in Energy and Environmental Design (LEED), Building Research Establishment Environmental Assessment Methodology (BREEAM), and Green Globes.

The "greening" of the construction industry is a multi-faceted process that cuts across many sectors of the Jamaican economy and is increasingly affected by the effects of climate change. For the purposes of this report, the construction industry is assumed to encompass all aspects of the built environment including related planning and energy concerns.

The construction sector in Jamaica has been comparatively slow to implement international standards of green construction. Like many developing countries, Jamaica has been grappling with capital scarcity, underdeveloped regulatory systems, economic uncertainty, and lack of capacity in the construction sector. There is a lack of familiarity with the appropriate standards, and the absence of modern building legislation also contributes to low levels of greening in the construction industry. Low levels of public investment, increasing labour and material costs, and weak demand in a sluggish economy have also affected the sector negatively.

Despite these conditions, there are some areas in which green construction has established a foothold in the market.

System building, which is a method of construction that utilizes modular and/or prefabricated components to create structures, has become the accepted form of construction for all types of buildings. The systems themselves are technically diverse but share the common characteristic of being resource-efficient.

By contrast, there has been little development in the area of innovative financing of green construction. The National Housing Trust (NHT) and the Ministry of Science, Technology, Energy, and Mining (MSTEM), in an effort to address this shortcoming, are currently evaluating the implementation of a Green Mortgage facility. This type of loan provides funding for energy upgrades by evaluating the expected reduction in energy cost and offsetting this savings against the additional mortgage premium. Increasingly, buildings will be evaluated less on the overall initial budget and more on the operating cost, and the total cost of ownership of the project.

Existing enabling policies and programmes

The Jamaican government has recognized the importance of creating a more sustainable economy with a construction sector that is climate change resilient. In furtherance of this goal, several steps have been taken to advance the green agenda.

Work has been completed on the new National Building Code-Jamaica (NBC) and the National Building Act (2011) is slated to be tabled in Parliament in 2015. The NBC consists of the 2003 International Code Council (ICC) Codes and their 2009 Jamaican Application Documents. The new code highlights established best practices to improve the efficiency of built works. Sustainability issues are specifically addressed in the code. The code stipulates that the International Energy Conservation Code (IECC) should guide energy efficiency insulation and non-hazardous materials should be used in material selection, the International Plumbing Code should guide water use, and that the International Private Sewage Disposal Code should guide waste disposal,

The government has also started to address the issue of climate change by formulating a Climate Change Policy Framework. Also underway are consultations on the establishment of an Environmental Regulatory Agency and on the

Draft National Habitat Report, which focuses on housing and sustainable urban development.

The GoJ/Inter-American Development Bank (IDB) Energy Efficiency and Conservation Project is addressing the greening of government buildings by retrofitting building envelopes, tinting windows, upgrading air handling and pumping systems, and installing new efficient lighting. The programme is projected to save US$ 7 million per year in energy expenditure and has an estimated payback period of a maximum of four years.[50] Similarly the University of the West Indies through the Institute of Sustainable Development is developing a new model for future buildings that uses resources in a radically more efficient manner. The Net-Zero Building Project is currently in the design phase and will create a prototype building that is both disaster resistant and produces as much energy as it consumes.[51]

According to the Housing Needs Assessment (1986 – 2006), Jamaica needs 15,000 new units and 9,700 upgraded units per year[52].

The government has an opportunity to set minimum green standards for these projects. By mandating higher levels of sustainability,

Box 2.
Private sector leadership in construction

Some private sector companies are now differentiating themselves in the market by promoting their sustainable solutions. Solutions such as energy audits, lighting retrofits, upgrading of air conditioning systems, and insulated roof coatings are becoming more common.

The hotel industry is one subsector where the economic benefits of sustainability are readily observable. Hotels are large consumers of energy resources (electricity for air conditioning, lighting and water pumps) whose business is heavily dependent on the beauty of natural surroundings. The benefits of reduced energy costs are complemented by a growing desirability and demand by tourists for green destinations.

The marketability of environmentally conscious hotels has also helped to spur the use of green building rating systems (GBRS) in the construction sector. GBRS are voluntary guides that exceed code requirements and create a mechanism for independent verification of the exemplary levels of sustainability that are incorporated in a built project. Green rating systems typically consist of a "checklist" of sustainability strategies that are assigned a point value. Projects can then be assessed based on the number of points that have been achieved and ultimately creates a metric for comparing levels of sustainability between buildings. The New Kingston Courtyard by Marriott hotel that is currently under construction was designed in accordance with the Leadership in Energy and Environmental Design (LEED) GBRS and seeks to be the first building in Jamaica to gain this certification.[54]

Private developers are also recognizing the opportunity to attract homebuyers by offering greener housing solutions. The over 800-unit Richmond Estate Development in Saint Ann features energy efficiency as a key marketing points for the community. Similarly in Saint Catherine the "Green Village Development" is a development planned according to LEED principles that received planning approval in December 2013 and is being marketed as "first 'GREEN' residential community of its kind in Jamaica."[55]

these projects will consume fewer resources over their life span and therefore provide net benefits to the economy. As UNEP emphasized, "the greatest potential to reduce energy demand will come from new generations of buildings with more efficient design performance standards"[53] in countries with significant housing needs like Jamaica.

Energy

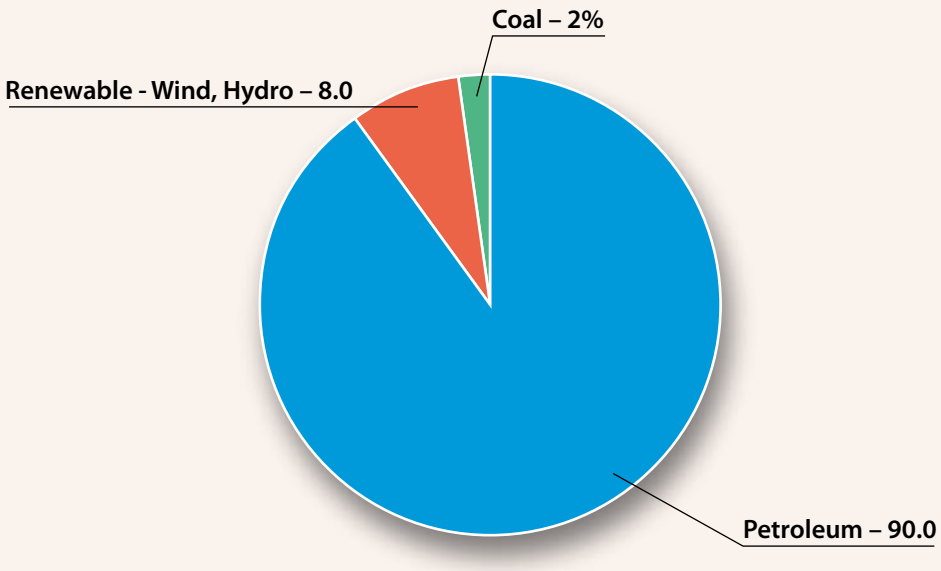
Successive governments have grappled with the problem of high energy costs, which are a major factor limiting the competitiveness of the Jamaican economy. The current policy goal is for renewable energy sources to provide 20 per cent of the national energy supply by 2030, double the current share of 10 per cent. This will reduce the dependence on imported petroleum and reduce the share of energy in the national import bill relatively, while potentially providing lower-cost supplies to households and firms. Though Jamaica emits low amounts of carbon dioxide and other greenhouse gases, increasing renewable energy sources will also make a marginal contribution to climate change mitigation. A study by the Worldwatch Institute[56] argues that Jamaica has the wind, hydro and solar resources to reduce its consumption of petroleum even more than the current targets.

Reducing the cost of energy is already a major priority of the GoJ. Several initiatives have been undertaken to implement the set of energy policies that reduce Jamaica's carbon footprint and that fall within the framework of Vision 2030. These are discussed in the next section.

The Jamaican economy is characterized by high-energy intensity and low efficiency and is almost completely dependent on imported oil, which provides approximately 89 per cent of the nation's energy needs. Figure 3 shows the distribution of the national energy supply by the main sources. Most renewable energy is supplied by wind and hydro, which each make up approximately 4 per cent of the total energy mix.

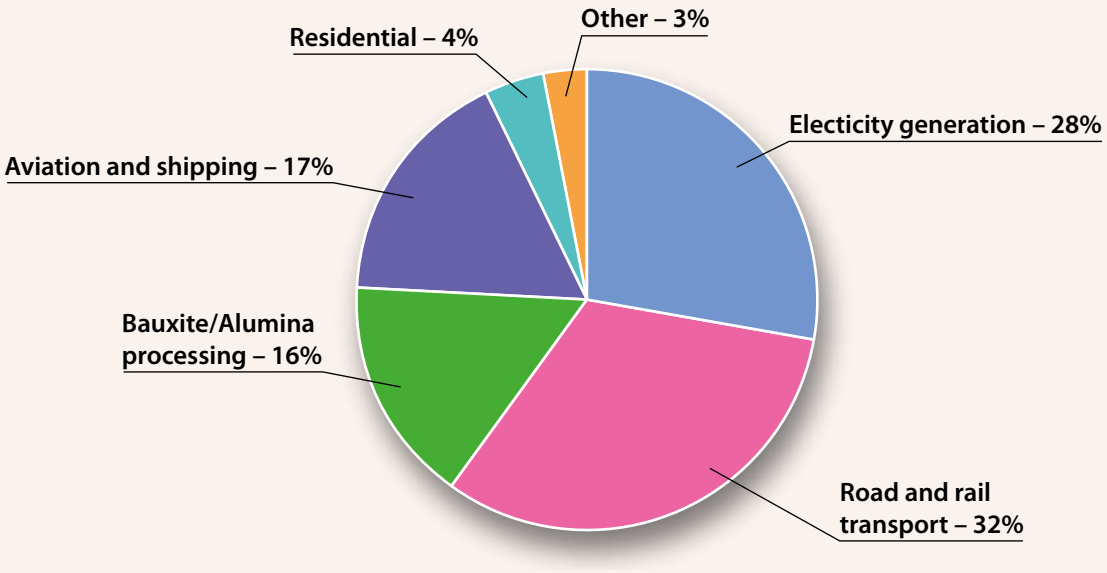
Petroleum consumption is concentrated in three areas: power generation for non-bauxite users, power generation for bauxite/alumina production, and transport. Transport uses the automotive fuels gasoline and diesel oil, which are the most expensive fuels.

Figure 3. Total energy supply mix, %, 2013



Source: Ministry of Science, Technology, Energy and Mining (2009)

Figure 4. Shares of petroleum consumption, % by use, 2013



Source: Ministry of Science, Technology, Energy and Mining (2009)

Consumption by the bauxite/alumina industry has been comparatively low since the collapse of the industry in the wake of the global crisis of 2008, and the very slow recovery since then. At the same time road transport has increased relatively and therefore presents challenges for conservation and the utilization of other fuel sources.

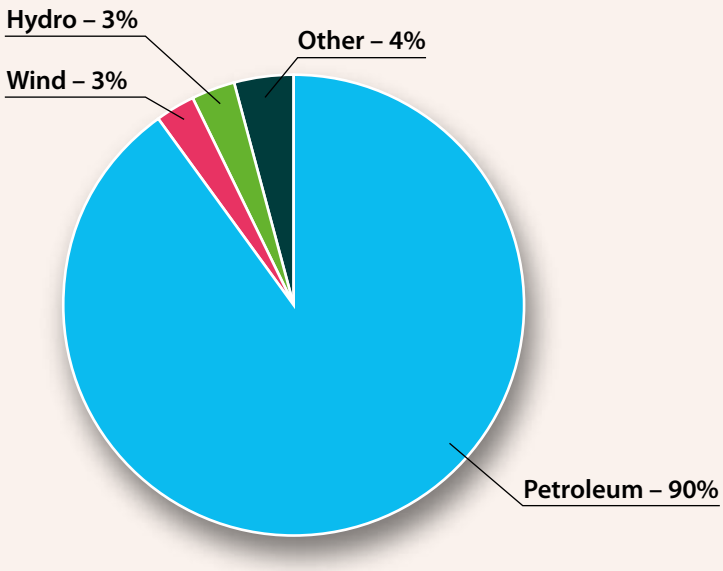
In 2013 the distribution of petroleum by activity was as shown in figure 4.

In Jamaica, over 95 per cent of households have access to electricity[57]. Electricity generation is characterized by high cost, low reliability, low power generation efficiencies, and high system losses. In 2013, 94 per cent of electricity generated came from oil, and the rest from wind, hydro, and to marginal extent, solar and biomass, as shown in Figure 5.

In 2006, Jamaica embarked on a comprehensive programme of energy efficiency improvement and energy diversification to provide high-quality, affordable, environmentally friendly energy and to reduce the country's dependence on imported oil. In 2009, the important role of the energy sector for the advancement of sustainable development in Jamaica was articulated in Vision 2030 Jamaica – National Development Plan, which sets out fifteen national outcomes that are designed to enable a major transformation of Jamaica from a middle income developing country to one which affords its citizens world class standards in key areas such as health, education, nutrition, basic amenities (such as energy and water supply) and access to environmental goods and services (e.g., clean air, freshwater). One of the fifteen national outcomes is "Energy Security and Efficiency" to "provide a secure and sustainable energy supply for our country". This outcome is to be accomplished by implementing two national strategies: to diversify the energy supply and to promote energy efficiency and conservation[58].

In November 2010, Parliament approved Jamaica's first long-term National Energy Policy 2009 – 2030, in keeping with Vision 2030 Jamaica. This policy is designed to ensure that Jamaica achieves by 2030: "a modern, efficient, diversified and environmentally sustainable energy sector providing affordable and accessible energy supplies with long-term energy security and supported by informed public behaviour on energy issues and an appropriate policy, regulatory and institutional framework".[59]

Figure 5: Fuel sources for electricity generation, %, 2013



Source: Ministry of Science, Technology Energy and Mining (2009)

To accomplish this vision, the policy articulates seven goals:

1. Energy conservation and efficiency
2. Modernizing the country's energy infrastructure
3. Development of renewable energy sources such as solar and hydro
4. Security of energy supply through diversification of fuels as well as development of renewables
5. Development of a comprehensive governance/ regulatory framework
6. Enabling government ministries, departments and agencies to be models/leaders for the rest of society in terms of energy management
7. Eco-efficiency in industries

Vision 2030 has targeted producing 20 per cent of the energy supply from renewables by 2030, and there is pressure from some quarters to increase the target share. Jamaica is already assessing the potential of various renewable energy sources and both the public and private sectors are currently in the process of developing new renewable energy sources.

Hydro and wind power have significant potential for Jamaica. Estimates have indicated[60] that hydro could provide up to 80 MW of electricity to the island's grid in addition to the eight hydro facilities currently operated by the Jamaica Public Service.[61] Additionally, the government has recently commissioned an updated feasibility study of small–hydropower potential in Jamaica.[62] Wind speed assessments have also been updated and the studies identified fifteen potential sites that were suitable for wind farms. The report noted that if "ten of these sites are developed, they could supply at least half of Jamaica's current power demand".[63]

The amount of solar power produced in Jamaica has been growing. The high cost of electricity, the declining cost of photovoltaic (PV) panels, and the corresponding reduction in the payback period for these types of installations has driven development. The introduction of net billing has also further reduced the payback period for PV systems by allowing users to opt out of the expensive battery storage option. The penetration

of PV has been facilitated by the increasing number of private and public sector financing options available specifically for energy upgrades.

There are some promising new developments in renewable energy in Jamaica. Two new wind power projects for a total of 58 MW, and a 20 MW solar project have recently been approved, and several small hydropower works are planned. The 381 MW gas-fired power plant that the government had been considering as a strategy for reducing energy costs has been replaced by a set of smaller projects. The chairman of the government's Electricity Sector Enterprise Team (ESET) charged with formulating the base load energy plan has indicated that they are considering a set of natural gas fired generating plants and a coal-fired co-generation facility for JAMALCO, one of the alumina companies, to come on stream in 2017.[64] Finally, in 2014 the Office of Utilities Regulation (OUR) has confirmed three successful bidders (2 for wind power and 1 for PV) for the supply of 78MW of renewable energy electricity generation to the national grid through Power Purchase Agreements (PPAs).[65]

Existing enabling policies and programmes

Even though Jamaica continues to advance a green agenda for its energy sector, there are still examples of conditions that are not environmentally sustainable and are not conducive to greening the sector. For example, Jamaica's National Energy Policy continues to make reference to the use of coal as a fuel diversification option for cogeneration, alumina plants, and public electricity supply. Recently, approval was given for the construction of a coal plant at one of the leading bauxite companies. This decision runs counter to the commitment to a green energy sector. Also, the country's current energy action plan 2013 – 2016 includes oil and gas exploration as one of its main projects.

Currently in Jamaica, there exists a range of frameworks that are expected to enhance improvements towards energy conservation and efficiency and the use of renewables in Jamaica. These will contribute to the greening of the economy. Some of these include:

Box 3.
Private sector leadership in energy

Across Jamaica, private sector leaders have been investing in energy and water efficiency and environmental management. Some examples are the modern and efficient ethanol plants at the poultry and fish producer Jamaica Broilers and the use of solar powered LED lighting in its chicken rearing and production plants; the energy and environmental management programmes at the Red Stripe wine, spirits and beer producer; efficiency investments in plant made by Carib Cement Company, investments in alternative energy technologies including solar PV and heating at the Sandals hotel chain and the newly installed 1.6 MW PV system at the Grand Palladium Resort in Hanover, Jamaica. [66]

Recently, the law firm Myers Fletcher and Gordon, installed the largest solar-wind hybrid installation in the world at its head office in downtown Kingston. The 50 Solar Mills, which consist of PV panels and Vertical Axis Wind Turbines are expected to generate 55 kW of solar energy and 25kW of wind energy while producing savings of US$ 2 million in energy cost over a 25-year lifespan.[67]

- A current and long-term National Energy Policy that presents goals and strategies that emphasize energy security, sustainable energy, and energy conservation at both the demand and supply side as well as the expansion of renewable energy
- Existing renewable energy policy
- Other energy sector policies including biofuels, energy-from-waste, carbon trading
- Vision 2030 Jamaica National Development Plan and its two national outcomes for energy and transport
- National and long-term sector plans for the energy and transport sectors under Vision 2030 Jamaica
- Focus on renewable energy – movement from 5.6 per cent in 2008 to 10 per cent in 2011
- Existing best practices – e.g. use of ethanol in gasoline, companies implementing major energy projects as a means of improving efficiencies
- Attempts to revive more environmentally friendly transport options such as rail
- Existing mechanisms to facilitate public-private partnerships such as those included in the Government's Consultation Code of Practice
- A green procurement framework that needs to be revised to better facilitate more environmentally-friendly consumption and production practices within the public and private sectors

Other frameworks that are expected to support the greening of the Jamaican economy which relate to energy include:

- Promulgation of a National Transport Policy that takes into account issues and actions related to:
  - Importation and use of energy-inefficient motor vehicles (based on type, size, age and fuel use)
  - More efficient and adequate public transportation system in the Kingston Metropolitan Area (KMA) and other urban and rural areas

Windmill in the distance – © shutterstock

Table 5. Energy efficiency-related initiatives in Jamaica in the last 3 decades

Programme	Financed by	Period	Main Priorities	Achievements
Project for Energy Conversation and Efficiency in the Public Sector	IDB and GOJ	2010 – 2011	To evaluate energy consumption in the public sector and develop plans to implement corrective measures	Assessment of energy and patterns
Programme of Environmental Management in Hospitals and Schools	UNDP and GOJ	2006	To kick-start energy conversation activities in the public sector, particularly hospitals and schools	Energy audits showed potential annual savings of about USD 1.8 million at investment costs of roughly USD 3.6 million
Household CFL Distribution Programme	Republic of Cuba and GOJ	2006-2007	Providing state-led intervention in energy efficiency measures at the household level	Estimated load reduction in 80 MW of demand or 48,500 MWh of electricity, as well as large-scale acceptance of the product and its benefits by the general public
Jamaica Demand Side Management Programme, JDSMP	World Bank/GEF and GOJ	1994-1998	Demonstrating a broad-based utility DSM programme	Reduction of the electric load by almost 1.7 MW and electric savings of approximately 5,350 MWh per year
Least Cost (Electricity) Expansion plans, LCEP	JPS OUR	2004 2007	Establishes a balance between capital investments that flow into the electricity sector and the price to the consumer	
Energy Audits for Sustainable Tourism, EAST	USAID and GOJ	1997-2002	Demonstrating the benefits of environmental management systems to the hotel sector	Reduction in water consumption by 50 million gallons and energy use by over 1.6 KWh
Energy Sector Management Assistance Programme, ESMAP	UNDP/World Bank and GOJ	1990-1991	To ensure that proposed investments in the energy sector represented the most efficient use of domestic and external resources	Energy Efficiency Building Code (EEBC°; Appliance Testing and Labeling (ATL) programme; and other technical assistance
Energy Sector Assistance Programme, ESAP	USAID and GOJ	Late 70s – late 80s	To provide technical assistance and funding of energy conservation and alternative energy requirements of the public and private sector	Energy audits and retrofitting that resulted in energy savings between 10 and 25 per cent

Source: A. Binger, 2011, Table 6, p. 43

- Efficient movement of traffic in urban centres, including efficient land transport modes for cargo and passengers
- Undertaking studies and conducting consultations with stakeholders on taxation levels for petroleum fuels (such as gasoline, diesel, kerosene, natural gas) with a view to instituting a system designed to enhance efficiency and conservation. This system will be consistent with regional and international trends and best practices
- Levying taxes on petrol at appropriate levels to encourage conservation
- Provision of adequate infrastructure for transition to alternative energy vehicles
- Increasing mass transit opportunities and utilization
- Research and development of alternate fuels for the transportation sector (e.g. liquid fuels from organic matter and compressed natural gas (CNG)
- Facilitating the use of more fuel-efficient vehicles in the transport sector as well as the use of diesel, CNG when it becomes available, and bio-fuels
- Introducing National Vehicle Emissions Standards and Regulations to reduce vehicular emissions

- Public finance and fiscal measures that promote green forms of transportation

- Greater investments in research and development in green economy issues as well as sustainable energy and transport

- Building the capacity of public sector officials in the area of the green economy

- More and bigger investments in cleaner technologies for industry

Table 5 reproduces a summary of "energy efficiency related initiatives in Jamaica in the last 3 decades"[68]

Tourism

Tourism plays a major role in the Jamaican economy, though the precise contribution to GDP is not easy to measure. The Ministry of Tourism and Entertainment (MTE) estimates that taken together, the direct, indirect and induced contributions of tourism to Jamaica's GDP were in excess of 11 per cent, and the sector accounts for 40 per cent of foreign exchange earnings. It directly employs over 75,000 workers, about 7 per cent of the working population, over half of these in the accommodation sub-sector alone. When indirect employment is taken into account, tourism provides a livelihood for over 250,000 Jamaicans. With the decline of traditional agricultural exports, the slowdown in the mining sector and major constraints on local manufacturing, the tourism sector is increasingly seen as a potential driver of economic growth and is accordingly expected to play a significant role in the country's Medium Term Growth Inducement Strategy as well as its long-term Vision 2030 development plan. This expectation is reinforced by the significant growth opportunities identified for the tourism sector based on international market trends.

The industry is a major user of economic resources and has a high environmental footprint in terms of energy consumption, waste disposal, and its impact on biodiversity. The concentration of traditional beach tourism in resort facilities in the coastal zones exposes the industry to the risks of sea-level rise, more intense storms and storm surges due to climate change.

In its major policy document, the Master Plan for Sustainable Tourism Development ('Tourism Master Plan'), tabled in Parliament in 2002, the Government of Jamaica endorsed the thrust toward sustainable tourism.

The term "green tourism" is often used interchangeably with "ecotourism", denoting a tourism market segment that focuses on the natural environment and is low in impact compared to standard commercial tourism. In the context of this green economy project, green tourism is defined in somewhat broader terms, connoting the alignment of tourism activities with the general policy orientation, objectives and strategic priorities of the green economy. In particular, green tourism concerns itself with making a contribution to environmental sustainability, poverty reduction, reduced carbon footprint, increased energy efficiency and sustainable growth and development.

There are many ways in which a green tourism strategy can benefit the industry and the wider

Jamaican economy and society. The most obvious benefits relate to increased economic growth, poverty reduction, job creation and environmental improvement.

Tourism is the fastest growing industry in the global economy, even allowing for the slowing effects of the 2008 recession. The potential of tourism as a potential driver of world economic growth is significant: tourism represents 5 per cent of world GDP and contributes 6-7 per cent of world employment, while accounting for 30 per cent of the world's exports of commercial services[69].

Within the global tourism market, eco-tourism, heritage tourism, adventure tourism and similar segments related to the quality of the destination environment, are among the fastest growing segments. In this regard, a green tourism strategy will enhance the competitiveness of Jamaica as a destination and as such, enable the tourism industry to tap into the global growth potential.

Arising from the growth and development of tourism business at various levels – national, local and community; large, medium, small and micro-enterprises; and across sub-sectors of the tourism industry such as accommodations, attractions, transportation, tours, services – the potential for job creation is vast. It has been estimated that each hotel room accounts for the direct employment of 1.3 hotel workers[70]. A green tourism strategy will mean increased size and diversity for the tourism workforce as additional and more specialized skills are mobilized to ensure new green standards in tourism entities. When the indirect employment effects in other related sub-sectors are considered against the background of increasing visitor arrivals, it is clear that the expansion of green tourism will mean more jobs in a wide range of occupations.

As stated before, the tourism industry is highly sensitive to the quality of the environment, and the Jamaican tourism industry has, over time, been involved in various initiatives to manage and improve the environment. A green tourism strategy

Beautiful sandy beach in Ocho Rios, Jamaica – © mikolajn

will have a direct impact on environmental sustainability by promoting greater awareness and higher standards of environmental management. International consumer trends have sensitized Jamaica's leading hoteliers to the value of a healthy environment, and international energy prices have brought a clear and strong focus on reducing energy costs through conservation and the use of renewable energy sources. USAID's Environmental Audits for Sustainable Tourism (EAST) project identified both direct energy waste, and indirect energy waste through excessive consumption of water, in selected hotels in a pilot project in 1997-2003. The leadership of the tourism sector is particularly responsive to the greening activities that reduce energy costs and enhance the environment. Issues of equity for the employed labour force are less readily addressed, as improved revenues from addressing these issues are not obvious.

Black-billed parrot – © Jamaica National Environment and Planning Agency

Existing enabling policies and programmes

One of the strategic objectives of the Government of Jamaica, as reflected in the Tourism Master Plan and the Tourism Sector Plan of Vision 2030 is to create a more inclusive tourism industry by spreading the benefits of tourism to a broad cross section of Jamaicans. This is seen as an essential requirement for the long-term sustainability of the industry, as the support and participation of the entire population is necessary for the industry to realize its full potential as a national industry. Green tourism implies the involvement of communities across Jamaica in providing the services and reaping the rewards of tourism. This broad-based and inclusive approach represents a potentially effective and sustainable approach to reducing poverty at the local level. Through programmes such as the Rural Economic Development Initiative (REDI), funded by the World Bank and administered by the Jamaica Social Investment Fund (JSIF) in collaboration with the Tourism Product Development Company (TPDCO), many small community-based tourism enterprises have received financial and technical support.

Many of the policies that currently govern the Jamaican tourism industry can be readily aligned with a green economy transition as they address important issues, and ultimately can be rolled up into a national strategy for greening the economy and in particular into a sectoral strategy for greening tourism. Some examples are:

1. *Vision 2030 Jamaica: National Development Plan* The Tourism Sector Plan provides opportunities for green tourism development by emphasizing growing competitive industries.

2. *Master Plan for Sustainable Tourism Development* This plan, published in 2002 through the MTE and the Jamaica Tourist Board (JTB) provides guidance for greening the tourism industry and includes promotion of Jamaica as a sustainable tourist destination. Key strategic objectives include:
   a. Growth based on sustainable market position through development of Jamaica's natural, historic and built heritage, in line with market trends
   b. Enhancing the visitor experiences through improving resorts and increasing the types and quality of attractions
   c. Community based development, enhancing the role of local communities in the tourism industry, to increase local support and enhance sustainability
   d. Making tourism a more inclusive industry by ensuring that the benefits of tourism are distributed widely throughout the society
   e. Environmental sustainability: the industry must contribute to the preservation of the natural environment

3. *Environmental policies and projects* The MTE partners with relevant organizations in developing and implementing policies including:
   a. National Ocean and Coastal Zone Management Policy
   b. National Policy and Strategy on Environmental Management Systems (EMS) – Goal # 1: Greening of government
   c. National Strategy and Action Plan on Biological Diversity in Jamaica – Goal # 2: Sustainable use of biological resources
   d. Jamaica Social Policy Evaluation (JASPEV) 2002-2015 – Goal # 5: Environment
   e. Current initiatives include:
      i. A Comprehensive Water Sports Policy to be tabled in Parliament
      ii. Promotion of EMS
      iii. Seeking international donor assistance for climate change policy implementation, including encouragement of carbon-free tourism and other sectors
      iv. For the fiscal year 2014-2015, J$ 252 (US$ 2.3) million earmarked by Government for the improvement of public beaches

4. *Small and Medium Hotel Energy Efficiency Programme* The MTE has been working with the Jamaica Hotel and Tourist Association (JHTA) and the Jamaica Public Service (JPS) to develop a programme to encourage energy conservation and increase the viability of properties of fewer than 200 rooms. The government provides interest-free loans to properties for retrofitting energy-saving devices such as LED lights and solar water heating systems.

5. *Tourism Enhancement Fund (TEF)* Established in 2005 and regulated by the Tourism Enhancement Act, this fund uses revenues collected from a levy on air and cruise tourism passengers to support implementation of projects aligned to the Tourism Master Plan. These include projects to improve the environment and lower energy costs, for example: support for the Montego Bay Marine Park; major upgrading of resort towns; development of heritage sites and installation of LED lights along the highway in the North Coast resort town of Montego Bay.

6. *Community Tourism* The government has developed a Community Tourism Policy and in keeping with this policy, is partnering with JSIF in support of community-based tourism projects under the REDI programme.

7. *Sustainable Tourism* Working with the Association of Caribbean States (ACS), the MTE has developed Sustainable Tourism Indicators for major resort areas. Also, policy initiatives have been launched in sustainable production and consumption through enhanced linkages between tourism, agriculture and manufacturing.

Box 4.
Private sector leadership in greening tourism

The private sector has been actively involved in green programmes. Several hotels and resorts have undertaken major energy efficiency, renewable energy, and recycling projects. Many hotels have also embraced certification programmes such as Green Globe and Blue Flag. Green Globe Standards is a collection of 337 compliance indicators applied to 41 individual sustainability criteria. Blue Flag works towards sustainable development of beaches and marinas through strict criteria dealing with Water Quality, Environmental Education and Information, Environmental Management, and Safety and Other Services.

8. *Disaster Preparedness* A Multi-Hazard Contingency Programme has been in place since 2006, enhancing destination resilience in the face of threats from hurricanes, drought, earthquake and tsunamis. A Tourism Emergency Management Committee (TEMC) works in collaboration with the Office of Disaster Preparedness and Emergency Management (ODPEM) and other agencies providing training to stakeholders in emergency management, damage assessment, and business continuity. This has increased capacity to prepare for and recover from disasters, but there is a need for ongoing training, including "Train the Trainers" programmes.

There is collaboration between the Ministry of Tourism and Entertainment (MTE) and the Ministry of Water, Land, Environment, and Climate Change (MWLECC) aimed at making the tourism sector carbon-free.

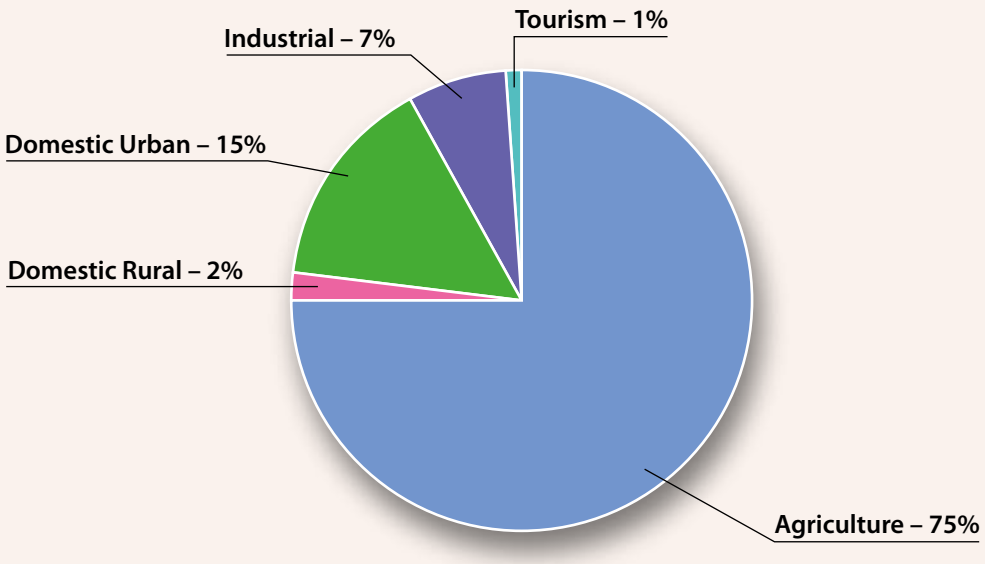
Water

According to the Water Resources Authority (WRA), Jamaica has abundant freshwater resources, with the equivalent of 77 per cent of current consumption still available for development, and only 10 per cent of the total resources contaminated. The challenge that the sector faces is to supply the demand adequately, wherever it exists. Jamaica is divided into 10 hydrological basins. The more abundant water resources are on the north coast while the greatest demand for the resource is on the south coast. In his 2014 contribution to the Sectoral Budget Debate, the Minister of Water, Land, Environment and Climate Change stated that of the ten hydrological basins, only in Kingston does the water demand exceed availability. He went on to say that the projection to 2025 indicates demand will exceed available water resources in the basins in Saint Catherine and Kingston, but this can be reduced if appropriate mechanisms are utilised to reduce non-revenue water, or water supplied by the NWC for which it receives no payment.

It is estimated that approximately 75 per cent of the water produced is used for agricultural purposes, 17 per cent for domestic uses, and the balance of 8 per cent for tourism and industrial purposes[71]. Figure 6 shows the distribution of water by major users in 2014.

The National Water Commission (NWC), a solely owned government company, is the major provider

Figure 6. Shares of water consumption, %, by major users, 2014



Source: Water Resources Authority, Government of Jamaica (2015)

of water and wastewater services. There are also some small private players in the sector. The Parish Councils provide some areas with water and the National Irrigation Commission supplies water for irrigation purposes.

The NWC supplies over 90 per cent[72] of the potable water from two major sources, surface and groundwater. Groundwater is abstracted from wells and surface water is from reservoirs and rivers; springs constitute another source. Approximately 60 per cent of water supplied by the NWC is from underground sources. The NWC distributes water through approximately 10,000 kilometres of pipeline[73].

According to the Census 2011, an estimated 57 per cent of households have water piped into the house 16 per cent of households have water piped into the yard, and 6 per cent use a standpipe. This means that a total of 79 per cent of households use a piped water source for their drinking water and an estimated 21% does not have access to piped water. Of the rest, 11 per cent use water from a catchment and 10 per cent use other sources such as spring/river or trucked water. Where there is piped water service, the level of service varies across the country.

In some instances, water is supplied during specific periods and on particular days. Additionally, much of the water system infrastructure is very old and in poor condition.

The level of water for which no revenue is collected is unacceptably high. In 2012, 68.7 per cent of the water supplied was non-revenue water (NRW).

Finally, NWC is the largest single customer of the Jamaica Public Service Company (JPS), the principal supplier of electricity. Energy accounts for about 35% per cent of NWC's operating costs. The NWC operates from over 600 sites across hilly terrain, which accounts for the high energy usage. The JPS' and NWC's peak demand coincide, which causes the NWC to pay a premium price for electricity[74].

Jamaican crocodile – © Brandon Hay

Box 5.
Water projects underway

The NWC has initiatives underway to restore the quality of groundwater and to improve efficiency. Among them are projects to recharge the aquifer, to rehabilitate sewage plants, to extend the sewer system in the parish of Saint Andrew and to install central sewer systems to serve all major towns across the island. These projects are all important to restoring the quality of groundwater.

The water sector must adapt to the impacts of climate change and variability in the form of threats of salination of aquifers, long periods of drought, and the high risk of flooding. Housing design, siting, and construction are responding to homeowners concerns for the energy costs for lighting, and increasingly, cooling as the climate warms. Strategic responses include reducing the rate of petroleum-based energy consumption, and improving the efficiency of use of the indigenous energy and water resources.

Existing Enabling Policies and Programmes

The Ministry of Water, Land, Environment and Climate Change (MWLECC) is responsible for setting policy in the water sector. The Water Resources Authority manages and protects all the water resources on the island and the National Environment and Planning Agency (NEPA) ensures all environmental standards are met. In addition, the Ministry of Health has a key role to play in ensuring that a healthy society exists by developing policies and enacting legislation to this end.

In line with the Government of Jamaica's Vision 2030, the MWLECC is in the process of preparing a new Water Sector Policy to reflect the government's commitment to the Integrated Water Resource Management as well as to guide the sector's adaptation to climate change and resilience to climate variability. The service areas considered are water supply, wastewater management, irrigation, and flood control.

The draft Water Sector Policy 2015 is being guided by four (4) principles[75]:

- *Sustainability* – all water resources will be used sustainably
- *Access* – all Jamaicans will have access to basic services and those who wish to use water resources sustainably for enhancing prosperity will be able to do so
- *Inclusion* – regardless of means, all Jamaicans will have access to reliable water supply and sanitation services and will have a voice in the management of the resources
- *Economy* – water resources will be used efficiently and service providers will be self-financing

The goal is for all Jamaicans to have access to safe and reliable water supply by 2030. The policy has divided the country into Utility Service Areas (USAs) and Non-Utility Service Areas (NUSAs). The USAs are those parts of the country where it is economical to provide the population with piped water and sewerage systems and the NUSAs are where it is not economical. It is estimated that approximately 85 per cent of the population reside in the USAs and will be serviced by the NWC or other utility service provider. Persons living in the NUSAs will be served by other modalities.

The MWLECC has also prepared a Climate Change Policy Framework, which among other things,

outlines currently occurring as well as anticipated impacts on the water sector and, by extension, human development. Some of the impacts are:

1. occurrences of severe weather events; in particular droughts, and tropical cyclones
2. contamination of ground water resources due to the intrusion of sea water into coastal aquifers as sea level rises
3. greater levels of sedimentation in reservoirs and dams, and sediment transport to coastal resources as soil erosion increases with the greater incidence of more intense rainfall and hurricane events
4. degradation and destruction of watersheds
5. water shortage during periods of prolonged droughts
6. damage to water storage and supply infrastructure caused by extreme events

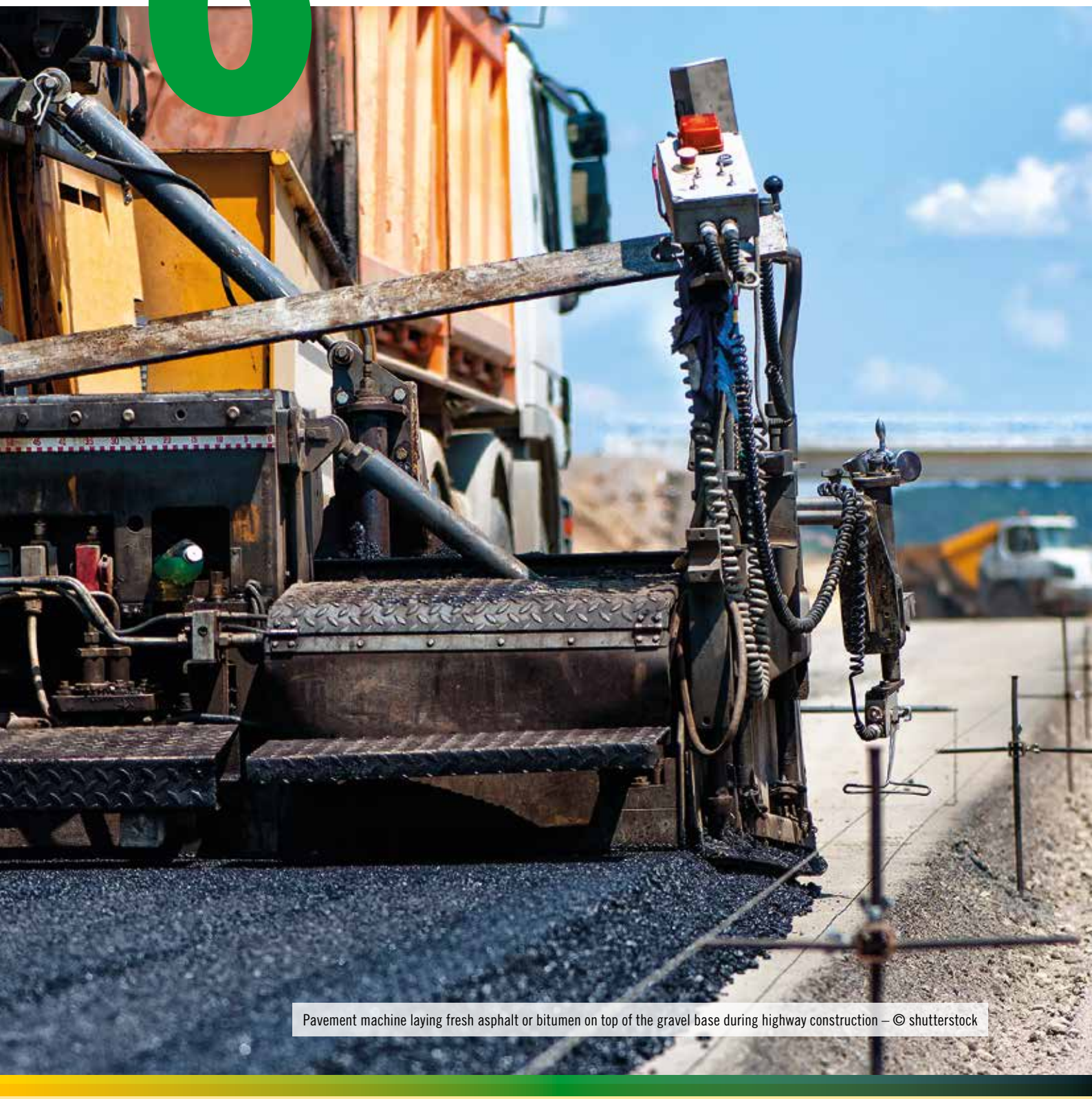
Sewerage

Approximately 17 per cent of the population is served by sewerage facilities operated by the NWC. Currently, four major towns have central sewerage facilities and the NWC operates another 68 smaller treatment plants associated with housing developments. The rest of the population disposes of sewage with various types of on-site systems such as septic tanks, soak-away pits and pit latrines, which can lead to contamination of the groundwater aquifers. Some years ago, all of the NWC wells in lower plains of Kingston and Saint Andrew had to be taken out of commission as a result of the high nitrate levels caused by soak-away pits[76].

Existing enabling policies and programmes

The Soapberry Sewage Treatment Plant in Kingston was built in 2008 at a cost of US$ 40 million in order to help to protect aquifers. The NWC is actively laying the trunk main that will convey the sewage to the plant. The project will result in the eventual restoration of the wells, which in the past produced some 41 million litres per day. The NEPA has recently gazetted new Wastewater and Sludge Regulations, which will penalize individuals and entities for breaching various standards. Currently, the GoJ is exploring the use of treated effluent from Soapberry for irrigation purposes. This type of activity would be supported under the Wastewater Sludge Regulations[77].

6 POLICY RECOMMENDATIONS



Pavement machine laying fresh asphalt or bitumen on top of the gravel base during highway construction – © shutterstock

Strategy for greening

A strategy for greening the Jamaican economy should focus on using the country's natural resources sustainably in economic activities that minimize emissions of greenhouse gases while providing decent jobs for working people, to produce goods and services that have low impact on the natural environment. Greening the economy can advance sustainable development by generating economic growth and social equity, with a low impact on the local environment and the global atmosphere. Greening the economy is particularly urgent for a vulnerable SIDS like Jamaica that must adapt to climate change and to the rapidly changing international economy.

Greening will require the appropriate and relevant signals from governments and markets to producers and consumers. In particular, government must design a package of policies with the attendant regulations to incentivize green investments while dis-incentivizing "brown" investments, as well as guide private and public consumption away from practices that are harmful to both public health and the environment. Such a package must be supported by the socialization of young people and continuous public education around the relevant themes of efficient use of resources, conservation, proper waste recycling and disposal, and social and economic equity. Ultimately, the success of greening will depend on the profitability of investments in sustainable production, and the sense of well-being that consumers derive from sustainable consumption.

Enabling conditions for greening the Jamaican economy

To make the transition to a green economy, specific enabling conditions will be required. These enabling conditions consist of national regulations, policies, subsidies and incentives, as well as international market and legal infrastructure, trade and technical assistance. Globally today, enabling conditions are heavily weighted towards, and encourage, the prevailing brown economy, which depends excessively on fossil fuels, resulting in resource depletion and environmental degradation.

For Jamaica enabling conditions will need to be developed to address the imperatives of responding to climate change, the evolving structure of threats and opportunities in the international economy, and revision of international and national development policies. The conditions that will enable greening the energy and water sectors, and, to a lesser extent, the construction sector, impact agriculture and tourism as well because the activities of those first three sectors cut across the latter two. Other enabling conditions are sector-specific.

Also noted in the previous section are recently and currently executed sectoral programmes aligned to the respective development plans and policies. Together, they constitute the elements of a strategy to manage the transition to a green economy. Still to be articulated is an explicit coherent strategy for greening, which will bring together the various strategies, and the plans and policies that embody them.

Macroeconomic policies

Jamaican governments have moved decisively over the last two decades to a macroeconomic policy framework that emphasizes stability as indicated by a low inflation rate, a competitive real exchange rate, a low interest rate, a balanced budget, and a rate of economic growth that is at least modest (2-3 per cent). The current EFF agreement with the IMF has required a drastic cutback in incentive programmes. while allowing for a remnant that is not subject to ministerial discretion. This macroeconomic policy is informed by market liberalization and the removal of all distortions, such as subsidies and other forms of tax incentives.

Under the current EFF, the GOJ is constrained from providing tax incentives to encourage greening. However, it is likely that through the tax reform process the government will remove subsidies that support the "brown" economy because of the revenue loss that these subsidies entail. The removal of subsidies from traditional industries will make for a more even playing field for green investments. Removal of subsidies on energy will automatically be a boost for greening because consumers and firms will have to conserve on both energy and water in the face of high prices, and seek alternative sources of

energy which are likely to include renewables, though there may be some drawbacks for greening, as the current tax-exempt status of imported energy-efficient equipment would change under a uniform tax rate.

Differential interest rates were abolished immediately with the liberalization of the financial sector in 1991. Uniform rates across sectors remain as a cardinal requirement for IMF stabilization programmes, and structural adjustment programmes by the World Bank, the IDB, and other international development partners.

If, however, it becomes possible to provide fiscal and monetary incentives to encourage greening, the GoJ should tap into the lessons of its own experience with such programmes, as well as the current experience of countries that have incentive regimes in place to support and encourage the greening of their economies. To be effective, such incentives have to be limited in time and scope, with measurable progress as the fundamental criterion for maintaining the incentive. This is often easier said than done, because of the cost and feasibility of monitoring the beneficiaries, which is why the experience of modern incentive regimes should be used as a guide.

Even within the fiscally constrained environment, the GoJ does have options for incentivizing green economy initiatives. Options for incentives include concessional prices for land, easing the costs of doing business, training a productive workforce, sourcing international green financing at concessional rates for on-lending, and measures to secure and maintain the confidence of both national and foreign investors.

A programme of incentives should be complemented with relevant, transparent, easily-implemented regulations to manage the impact of economic activities and waste disposal on the environment, and to ensure decent working conditions, as stipulated by the International Labour Organization, for the labour force.

The government can also set examples, such as in the Government of Jamaica Environmental Guide to Green Procurement[78], and in the GoJ/IDB Energy Efficiency and Conservation Project that seeks to green government buildings through retrofitting their envelopes.

Agriculture

As is stated in the government's Procurement Policy statement, the successful greening of Jamaica's agriculture sector will depend largely on how well the country can adopt and capitalise on green production opportunities and markets for green goods and services.

Greening agriculture will require a framework of policies that offer price and other incentives to encourage private investment from the local business community and farming households, from the Jamaican diaspora and from foreign investors. Public investment in infrastructure for the sector and in services to support the small-farming community will be constrained in the short run by the commitments to the current Extended Fund Facility with the IMF, and by fiscal prudence in the long run. Some specific measures recommended for inclusion in a framework for greening are:

1. ***Support sustainable land management*** Greening the sector will require sustainable land management, for which a policy has recently been prepared and is awaiting Cabinet approval.

2. ***Enact land reform*** Land reform that provides acces to land for the many landless farmers along with finance and the other supporting business services, is essential for an inclusive development that addresses the historical inequities and the prevalence of poverty.

3. ***Create water management systems*** It is also imperative to develop proper systems for water management, including harvesting and storing rainwater to mitigate the long dry periods during the year and minimizing the damage from flooding during heavy rains.

4. ***Provide incentives*** Investments in green technologies and cultivation practices that have low impact on the environment have to be incentivized by balanced fiscal policy that encourages green investment projects while facilitating the re-allocation of capital from traditional green activities.

5. ***Diversify energy sources*** Solar, wind, hydro and biofuels can replace the petroleum-based energy that the sector uses directly, as well as indirectly to pump water and as chemical inputs.

6. ***Conduct research*** Research into climate resilient varieties of plants and animals will also be necessary to transform the sector to cope with climate change.

7. ***Provide green agricultural extension services*** A modern agricultural extension service will be responsible for encouraging the adoption and adaptation of new green technologies and new research results.

8. ***Create a policy framework for greening the agricultural sector*** A strategy for greening the agricultural sector will combine the above with other structural changes in the mix of output and the markets targeted. This will entail more emphasis on organically produced goods and environmental services, and more attention to penetrating fair trade markets and niches in the international markets for organically grown produce.

Construction

To foster the continued development of the green construction sector the government must provide the framework policies that will support the desired growth. These measures include:

1. ***Enact the National Building Act and enforce the New Building Code (NBC) of Jamaica*** The NBC is a substantive evolution of the current building practices and will set the new mandatory minimum standard for building projects. Codes have been identified by the Intergovernmental Panel on Climate Change (IPCC) Report, 2007[79], as being "relatively simple to implement when compared to the cost of implementation" and as "a highly effective and of medium cost-effectiveness in mitigating CO2 emissions from the building sector".[80] The same report further stated this effectiveness is critical for the Caribbean region where resources are constrained. A comprehensive and enforced building code will do more than any other single measure to create a greener built environment. The NBC will, however, only address the minimum acceptable standard for greening buildings.

2. ***Adopt codes and standards that mandate green construction practices*** The International Green Construction Code (IgCC) is designed as an overlay to the codes like the NBC[81] and creates an enforceable baseline for sustainability in building projects. The adoption of the IgCC as a code would make many green best practices mandatory parts of the building approval process.

   Other green building standards will be important tools for projects that voluntarily seek exemplary levels of greening. An added benefit of the adoption of Green Building Practices (GBP) is the relative ease of scaling up of these practices from simple residential applications into large-scale applications. "By greening our built environment at the neighbourhood and city scale, we can deliver on large-scale economic priorities such as climate change mitigation, energy security, resource conservation and job creation, long-term resilience and quality of life."[82]

   There is also the ISO50001, which is an energy management standard with associated training, and tools for improving energy efficiency in organizations. As with other ISO certifications, this is also voluntary, but could be promoted by government.

   In addition to adopting and mandating new standards the government must lead by example in the structures that it builds and occupies.

3. ***Develop a local Green Building Rating System (GBRS)*** [83] In the Jamaican jurisdiction, there is no widely accepted standard for evaluating the level of green in a project. To address this need, a GBRS should be developed to reflect the specific social, economic and environmental conditions in Jamaica. A local GBRS would provide an opportunity for projects such as the recently completed Digicel Headquarters building to seek and gain third party verification of the level of green that the project has achieved. Rating systems can also be linked to economic incentives

such as reduced insurance rates, preferential access to government services, such as project approvals, and tax disincentives for emissions and inefficient resource use. Additionally, the use of a rating system safeguards against the growing trend of greenwashing in which products, companies or projects unjustifiably claim credit for unattained environmental objectives.

4. ***Review and revise the existing Development Orders (DO) and other planning guidelines to reflect sustainable planning principles***
Specifically, the DO should encourage greater density, mixed-use developments, and less automobile use. The new planning strategies will have to better address the important relationship between sustainability and urban spaces, as well the unique conditions needed for green growth in rural areas. Consideration will also have to be given to stated objectives of both the Vision 2030 project and the National Renewable Energy Policy that renewable energy should account for 20 per cent of total energy use by 2030. For this objective to be achieved, the planning framework will have to evolve to fully integrate on-site renewable energy sources such as wind, PV and waste-to-energy systems.

The need for planning review is particularly urgent in the Kingston Metropolitan Area (KMA), which is comprised of the urban areas of Kingston, Saint Andrew and Saint Catherine. This aggregation of previously disparate cities and towns into one continuous urban space is defined as a conurbation. The larger population (and rapid growth of the KMA) necessitates the revision of the existing development orders and planning guidelines. Modern planning practices and green codes are based on the premise that greater density creates more sustainable urban spaces.

Special strategies must be developed to manage the tradition of homeowners' own construction and the spontaneous growth of squatter settlements. Both of these will require close monitoring within an ongoing process

of dialogue between the local government authorities and the citizens.

5. ***Provide financial incentives for the use of green building solutions***
   Incentives have been widely used worldwide as mechanisms to encourage green growth, helping to create win-win solutions by aligning the goals and interests of developers, owners, builders, the government and end users. Typically incentives have been used to overcome perceived or actual high "first–costs" of building green. Examples of economic incentives include: tax holidays, import duty concessions and energy costs rebates. Faster approvals and concessionary approval fees can also encourage builders and developers of green projects or planning allowances such as reduced parking requirements or greater lot density. There can also be linkages with green job creation.

6. ***Expand training programmes in sustainability related fields to ensure a sufficient supply of adequately trained workers***
   Green jobs[84] reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. The number and total economic effect of green jobs are often difficult to disaggregate from construction jobs in general. This occurs primarily because these jobs often require some core skills and some new specific expertise. A study of the construction industry in South Africa in 2012[85] revealed that nearly 50% per cent of all contractors have serious concerns about the ability to find skilled experienced workers. In Jamaica, a skilled workforce will be required to facilitate green growth and to create a basis for the export of services and expertise in these areas. Green construction jobs typically involve the application of green technology/practices or use of green materials in the built environment.

   A green construction strategy should be based on a green-enhanced building code with regulations that have weighty sanctions.

Energy

The elements of a green strategy for the energy sector are already in place in the various policy documents that have been prepared. These should be pulled together in an overarching vision of the sector that maximizes the use of Jamaica's potential renewable energy resources, and shapes the use of energy for electrical power and transportation to support sustainable production and consumption. Within an ongoing campaign of conservation, the GoJ must fashion the requisite dynamic programme of incentives and regulations that evolves with the implementation of the strategy.

Some measures to support the existing initiatives are:

1. ***Maintain the exemption of duties and taxes on energy efficiency and renewable energy equipment.***

2. ***Increase the price offered for power to the national grid under the net billing regulation*** introduced in 2012. The price offered – 20-24 cents per kWh – is not very attractive.

3. ***Provide financial facilities for renewable energy and efficiency enhancement projects.*** There is a J$ 4.6 million (US$ 38,000) line of credit through the Development Bank of Jamaica for businesses to implement renewable energy and efficiency-enhancement projects. Other financial facilities are:

   – The Development Bank of Jamaica has instituted a US$ 1 million fund for residential energy loans to finance renewable energy solutions such as small wind turbines, solar panels, and biogas digesters
   – The National Housing Trust has introduced two loan facilities to facilitate the installation of solar water heaters and solar photovoltaic panels
   – Private commercial banks also issue loans for solar water heaters and other residential renewable applications.

4. ***Discourage the importation of inefficient motor vehicles*** by linking the tax regime to the energy consumption as measured by the kilometers per litre of gasoline that the vehicle consumes, and encourage the use of electric and hybrid vehicles with a low tax rate.

5. ***Encourage energy-reducing transportation measures*** such as: efficient traffic

management, carpooling, park and ride, use of clean fuels to minimize pollution, flexi-work hours, an efficient public/urban mass transit transport system, and non-motorized transport. Promote vehicle and road maintenance programmes.

6. ***Implement the Energy Efficiency Building Code*** to ensure that new buildings incorporate green designs and are energy efficient.

7. ***Promote the conservation of energy and water.*** Measures to conserve water automatically conserve energy. This should be a central theme of public education on energy use.

Tourism

Like the energy sector, a green strategy for tourism can be crafted from the Master Plan for Sustainable Development and the various initiatives undertaken by the operators of hotels and attractions. The sector has benefitted from various incentives in the past, but the trend of fiscal reform is to remove those that reduce public revenue. New incentives and regulations that do not burden the budget will have to be designed.

Some measures to further the process of greening are:

1. ***Promote and incentivize renewable energy use and water use reduction*** to reduce the environmental impact of the sector and to enhance profitability.

2. ***Plan for sea level rise and the other impacts of climate change*** in order to enable the sector to continue to be an economic driver in the context of a changing climate.

3. ***Develop and implement branding and marketing strategies emphasizing green elements of tourism*** to take advantage of new markets and to reduce the environmental resources that the sector uses so as to minimize its negative environmental impact.

4. ***Provide green investment incentives*** Green investment incentives include fiscal incentives for specified activities, which contribute to environmental protection, energy conservation, and/or poverty reduction. For example, duty-free status could be given to a range of new energy-saving technologies (not limited to productive inputs). Carbon trading is one innovative approach being practiced in Europe, the potential of which has not been fully tapped in the Caribbean. Tourism entities could be incentivized to go green if mechanisms were developed to enable them to benefit from carbon trading regimes by trading carbon credits with relevant enterprises in industrial countries, such as airlines. Green incentives include energy-efficiency grants to investors. However, given

Bob Marley museum – © UNEP

that fiscal incentives may be problematic in a situation of high debt and policies of fiscal retrenchment, emphasis will have to be placed on generating revenues to finance these incentives. Investments in innovation are driven mainly by the prospect of savings or earnings, which offset the investment risks and costs.

5. ***Promote investment in and provide incentives for small, medium and micro-enterprises*** For the incentives model to drive private investments, the incentives must be applied to those areas where risks and costs inhibit private investment. This is often the case with small and medium-scale enterprises, and less so with large corporations. Hence the incentive programmes could be targeted to the more risky investments and the smaller enterprises. Such incentives can be applied to tourism entities where financial resources permit, as has been done with grants to small and medium hotels financed by funds levied on travellers and administered by the Tourism Enhancement Fund (TEF) under the Tourism Enhancement Act.

   A programme of green investment incentives will need to have minimal impact on the Central Government Budget, and cannot contribute to any fiscal deficit or additional public external debt, which implies substantial grant funding or forms of indirect taxation. The Tourism Enhancement Act provides a viable model in principle, as revenues are levied on the tourism industry consumers and later used to provide incentives to tourism investors. However, the long-term viability of raising revenues in this way will be determined, to a large extent, by the impact on competitiveness of the destination.

6. ***Leverage public-private partnerships*** In some instances, the Government is a major stakeholder in tourism operations. For example, Bath Fountain and Milk River are two well-known spa hotels owned and operated by the Government of Jamaica. These properties should be developed as green tourism resorts, whether by Government, private investors, or a partnership of both. Similar partnerships could be used to promote the development of green attractions and health and wellness tourism.

Water and sewerage

1. ***Develop local catchment facilities*** in order to diversify the water supply and make it more resilient and to create efficiency.

2. ***Build a culture of rainwater harvesting and responsible and efficient use of water*** to reduce overall water needs and to create greater resiliency in the water system.

3. ***Develop more extensive sewage recycling*** building on existing experiences and facilities.

4. ***Implement cost recovery systems*** The most efficient way to price water is at full cost. However, this will require government subsidies to meet its commitment to universal access to water as a basic human right. It is estimated that it will cost approximately US$ 2.2 billion to reliably provide water and wastewater services to 85 per cent of the Jamaican population[86]. This is expected to reduce the non-revenue water (NRW) to world standards, provide reliable access at all times, replace the entire aged infrastructure, and implement strategies to reduce energy consumption. Current revenue collections are inadequate to meet even the day-to-day requirements of the NWC. This problem is twofold as the service is not properly priced, and there is a large section of the population that does not pay for the water it consumes.

   There is an ongoing debate as to whether the government should pay for people who are unable or unwilling to pay. This is complicated by the fact that not all supplies are metered, and where there are meters, these may be past their useful lives and are not accurately registering consumption.

   The current tariff regime is an increasing tiered system, with a concessional band that is subsidised by the other bands. The section of the population without piped water depends on various modalities for supplies, does not benefit from these subsidies, and may in some instances, pay higher prices for the service.

5. ***Reduce energy cost and diversify sources*** Some strategies proposed to reduce the cost of energy are:

- procure more efficient pumping units and motors
- replace old and inefficient motors
- use energy efficient lighting and air conditioning units
- conduct regular energy audits
- dialogue with the Office of Utilities Regulation (OUR) regarding wheeling policy
- apply alternative renewable energy sources to pumping
- encourage conservation and more careful use of water, especially in urban households, which account for 15 per cent of national consumption of piped water.

6. ***Implement Rural Water Supply Strategy*** In revising the Water Sector Policy, the government has devised a Rural Water Supply Strategy, which seeks to assist households and communities to build, and in some cases, upgrade their systems. The operating and maintenance costs will be the responsibility of the beneficiaries. A Water Access Fund is being proposed in the Draft Water Sector Policy 2015, to assist households and communities that cannot afford the upfront cost.

7. ***Provide sewerage services*** As with the supply of water, the draft water sector policy has divided the country into Utility Service and Non-Utility Service Areas, where the former refers to areas "where a piped sewerage network is the most cost-effective way of meeting the goals for sanitation".[87] The target is to provide sewerage services to 60 per cent of the population in Utility Service Areas by 2030, and to assist households in Non-Utility areas to operate their own facilities, individually, or in appropriate sharing arrangements. Charges are levied on the discharge of properly treated industrial and agricultural effluent into the environment, under the supervision of NEPA. The government will encourage the re-use of "treated wastewater where it is safe and economical".[88] Currently, the GoJ is exploring the use of treated effluent from Soapberry for irrigation purposes. This type of activity would be supported under the Wastewater Sludge Regulations.


Green Turtle – © Ainsley Henry

8. ***Continue to follow an Integrated Water Resources Management (IWRM) approach*** The government has adopted an IWRM approach "to promote the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems".[89] This approach is consistent with greening in terms of holistic public policy, the promotion of equity, and the sustainable management of natural resources.

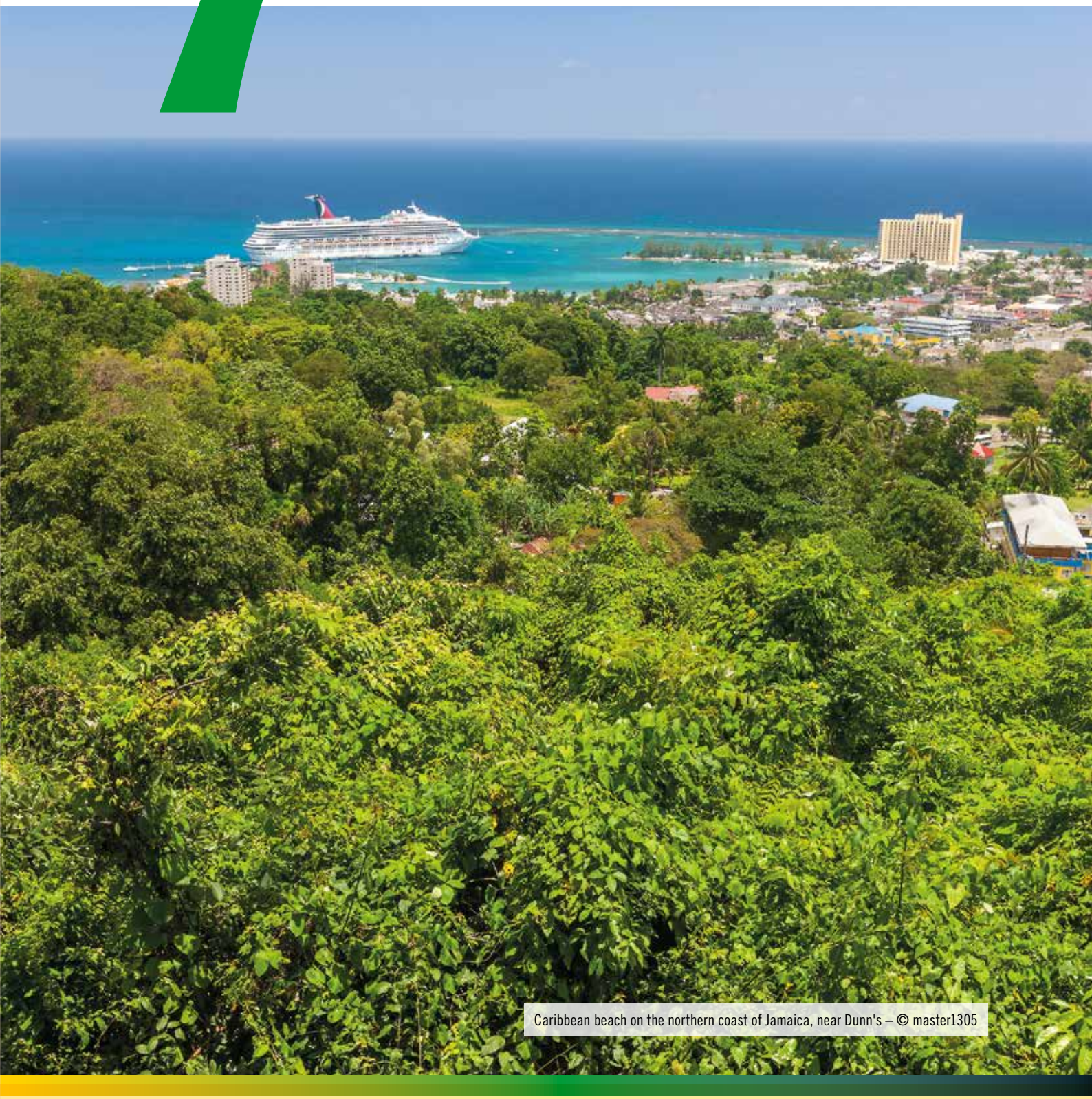
   Consistent with this holistic approach is the establishment and empowerment of Water Resource Management Committees (WRMC) that bring together the relevant public bodies and private sector suppliers for planning in each Water Management Area (WMA). WRMCs are mandated to use diverse methods to include community members, especially women and marginalized groups of citizens, such as the poor, in their deliberations[90].

   The government is also committed to forging public-private partnerships in all aspects of service provision, with appropriate regulations for private service providers under the supervision of the OUR.

9. ***Plan for climate change adaptation*** An important area for consideration in greening the water sector is adaptation to climate change and variability. This can be done through improved management of social and economic activities that impact on the hydrological and water resources, improved planning, regulatory enforcement, and more research. New infrastructure and service delivery must include due consideration of climate change and variability.


WATER CONSERVATION
AND THE GREEN ECONOMY
Take Shorter Showers
Turn off Tap When Brushing Teeth
Fix All Leaks
Use recycled water for Plants etc.
Use the half Flush

7 INVESTMENT PROGRAMME



Caribbean beach on the northern coast of Jamaica, near Dunn's – © master1305

This investment programme describes projects that are in the pipeline or recently started, which present immediate investment opportunities for greening the economy.

Other opportunities for greening the agricultural sector, such as tapping into alternative trading networks, such as fair trade, and organic, and improving the sector's water management and ecological potential should also be explored and developed.

Table 6 summarizes the framework of an initial green investment programme.

The PIOJ has done a rough estimate of the impact of this investment programme, assuming that there is a 51.7% per cent leakage from the economy. The approximately US$ 1 billion investment programme would yield US$ 400 million of value-added, or 2.7% per cent of GDP in 2013.

Table 6. Green Investment Programme

Agriculture, Energy, Construction	
Cogeneration of heat and power from bagasse and other forms of biomass	Upgrade boilers in 5 privately owned sugar factories from below 50% efficiency to 88% efficiency=> supply to the grid 94 MW of capacity during the 185-day harvest season, save 22.3 million gallons of oil imports per year Develop other biomass sources to sustain output for the entire year
Agriculture, Energy	
Rainwater harvesting and Solar-smart irrigation	An example of this is the Harishankar et al. system that consists of a solar-powered water pump driving an automatic irrigation module. The irrigation module releases water to the field according to the specified moisture content of the soil. In the original Indian development, water was tapped from bore wells. In Jamaica, the source could be harvested rainwater stored in tanks. FAO has already implemented a small rainwater-harvesting project in Saint Elizabeth, which is to be expanded in a second phase. The historical limited access of the farmers of Saint Elizabeth to irrigation, the high cost of electricity for pumping water, and the current drought suggest that a rainwater harvest cum solar smart irrigation would be of immense benefit and probably cost-effective. It is estimated that 3000 farmers on 4,500 hectares are in need of irrigation. Cost: US$ 80,000 over 2 years
Energy	
Construction of wind and hydropower plants and solar	Wigton Wind Farm -3: US$ 45 million for 24MW capacity BMR Wind Farm: US$ 90 million for 34 MW Hydro-power: US$ 28.5 million for mini-hydro facilities
381 MW power plant, likely natural gas	US$ 750 million over 28 months
Construction	
Retrofitting of government buildings	US$ 20 million
Installation of solar facilities in housing	US$ 1.5 million
Water	
IDB KMA W/S – Construction of a groundwater Artificial Recharge Facility, Innswood Saint Catherine	J$ 1.2 billion = US$ 10.7 million
Water-Waste	
CReW (IDB) – Rehabilitation of sewage treatment plants	J$ 1.5 billion = US$ 13.4 million
Continuation of the Kingston and Saint Andrew Sewer Expansion	n.a.

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The Green Economy Scoping Study for Jamaica identifies and assesses key opportunities for greening country's economy as a way to advance sustainable development. It describes the context and identifies opportunities at the macroeconomic level, as well as in five key sectors: energy, agriculture, construction, water and sewerage, and tourism. Based on a qualitative assessment of challenges and opportunities in the country, it proposes key policy and programme interventions that can advance a green economy.

The purpose of the study is to provide useful information to key stakeholders in order to improve the formation of on-the-ground and policy initiatives to advance an inclusive green economy in Jamaica.

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