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STOCKHOLM ENVIRONMENT INSTITUTE

FINAL REPORT: BELIZE STUDY

ECOSYSTEMS, DEVELOPMENT, AND CLIMATE ADAPTATION
Improving the Knowledge Base for Planning, Policy and Management

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I. BACKGROUND

The Importance of Coastal Ecosystems in Belize

Belize is the most sparsely populated nation in Central America with a landmass of 8,800 square miles and a population of 311,480 persons (Neal et al. 2008). Over 50% of the national territory is coastal and more than half of the population lives in this zone. The coastal area of Belize supports a wide diversity of ecosystems, including the second longest barrier reef in the world. The reef runs almost the length of the entire coastline forming a 220 km long living bulkwark that lies 13 to 48 km off the mainland coast, and consists of three offshore atolls, hundreds of patch reefs, seagrass beds, mangrove forests, and over 1,000 cayes (McField et al. 1996).

The barrier reef complex in Belize includes seven sites declared as World Heritage Sites by UNESCO, and it is essentially the backbone of the Mesoamerican Barrier Reef Ecosystem, which extends for 450 km as an ecological and geological unit along the Yucatan Peninsula of Mexico southward through Belize to the Bay Islands of Honduras. In addition to the World Heritage Sites, Belize has established 18 marine protected areas (MPAs) managed primarily by the Fisheries and Forest Departments in collaboration with local NGOs. The total marine area under protection represents around 20-25% of the total territory (based on a 3-mile limit). If only the area of "no take" is accounted for (area where no fishing or extraction is permitted), the protected marine area is reduced to 2% of the national territory (McField 2001).

The coastal and marine ecosystems in Belize are essential to a number of human activities that sustain the economy of the country. Belize has an open economy with a per capita GDP of about USD 8,000 (SIB 2007). The three major industries in the coastal zone are tourism, fisheries, and agriculture. A World Resources Institute (2009) study found that Belize's shoreline mangrove and coral reef system contributes between US$395-559 million a year to the national economy from tourism recreational activities, fisheries and shoreline protection.

Climate Change and Implications

Observed climate trends for Belize show an average increase in temperature of 0.9 °C from 1960 to 2006 based on data recorded at the airport meteorological station. More specifically there has been an increase of 0.4°C in average maximum temperature and an increase of 1.2°C in average minimum temperature, indicating that the nights are warming more than the days. The same station shows an increase in total annual rainfall since 1960, while the one in Belmopan shows a decrease [1]. Despite all seasons display precipitation trends, the overall trend is not statistically significant, meaning that we do not really know if the estimated trend is statistically reliable, particularly because it is not compared to or analyzed in the context of longer temporal records.

Global climate projections using four global circulation models for the Central American region show that the mean annual temperature is projected to increase by 0.8 to 2.9°C by the 2060s, and 1.3 to 4.6°C by the 2090s. The range of projections by the 2090s under any one emissions scenario is 1.5 to 2°C. The projected rate of warming is a little more rapid in the wet seasons than the dry seasons (McSweeney et al. 2008). Furthermore, projections of mean annual rainfall from different global climate models are broadly consistent in indicating a decrease in precipitation for most of Central America (Christensen et al. 2007). Projected anomalies for future total rainfall vary between -64% and +20% by the 2090s for different emission scenarios. Downscaling regional climate models to station level (i.e. airport meteorological station) show decreases in total rainfall and increases in average temperature for 2100 in the coastal zone of Belize [2]. However, there is high uncertainty associated with these climate scenarios, and it is difficult to define the magnitude of change in future climate (as opposed to direction of change, which has more confidence associated with it). What is more certain is the seasonal changes in rainfall pattern in the western Caribbean from the global models. The dry season may likely extend into the mid summer drought of early August, and the rainy season may turn out to be shorter but more aggressive [3].

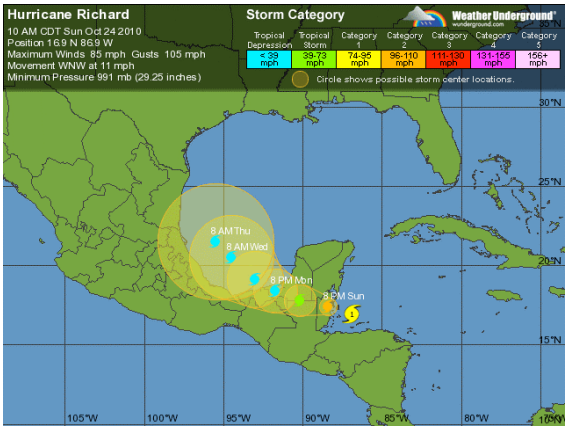
In addition to temperature and precipitation changes, the coastal lowlands in northern Belize may be vulnerable to sea-level rise. During the years 1961-2003, sea-level in the region rose at an average rate of about 1.8mm/year. This rate was faster during 1993-2003 with an average rate of 3.1mm/year (Trotz 2009). The following are sea-level rise projections (relative to 1980 – 1999 sea-level) for this region under different emissions scenarios for 2090s: 0.18 to 0.43m under SRES B1[1]; 0.21 to 0.53m under SRES A1B; 0.23 to 0.56m under SRES A2 (McSweeney et al. 2008).

Belize is considered a small island developing state (SIDS) because of its low-lying coast and set of islands, its coastal communities, and its economy (UNDESA 2005). In the coastal zone of

[1] Because projections of climate change depend heavily upon future human activity, climate models are run against scenarios. There are different scenarios, each making different assumptions for future greenhouse gas pollution, land-use and other driving forces. Assumptions about future technological development as well as population growth and the future economic development are also made for each scenario. These emissions scenarios are organized into families, which contain scenarios that are similar to each other in some respects. IPCC assessment report projections for the future are often made in the context of a specific scenario family: 1. A1 scenarios are of a more integrated world; 2. A2 scenarios are of a more divided world; 3. B1 scenarios are of a world more integrated, and more ecologically friendly; and 4. B2 scenarios are of a world more divided, but more ecologically friendly.

Belize, temperature rise, change in precipitation patterns, warmer sea temperatures, and sea-level rise will combine with non-climatic drivers (e.g. urbanization, migration, unsustainable harvesting) already affecting the country and resulting in impacts such as coastal erosion, flooding, saltwater intrusion, coral bleaching, and mangrove migration and die-back (CZMAI 2000, McField and Bood 2006). These impacts will affect ecosystems functioning and the marine biodiversity. Negative impacts on marine biodiversity will affect fisheries production and nature-based tourism, which is the largest income earner of the country. Impacts on these economic activities can put further pressure on the environment and natural resources, as they intensify to recover the losses. This can be intensified by increased frequency of extreme events such as hurricanes and storm surges that have direct effects on ecosystems, infrastructure, and local activities such as agriculture, tourism, and fisheries. Between 1980 and 2007 Belize has been hit by five hurricanes and three tropical storms. During this decade alone, Belize experienced three major hurricanes. The 2008 tropical storm, named Arthur, cost Belize USD 78 million in damages. This made it the third most costly season on record, behind only the 2004 and 2005 seasons, with up to USD 45 billion in damage to Belize (Trotz 2009).

In October 2010, Belize experienced again a major shock after being affected by hurricane Richard. Richard made landfall along the coast of Belize, about 35 kilometers south-southwest of Belize City, packing sustained winds of 150 kilometers per hour (National Hurricane Center 2010). Storm surge raised water levels by as much as 1-1.5 meters above normal tide levels along the coast of Belize, and particularly along the storm's track. This resulted in significant flooding along Belize's low-lying coast, which is for the most part at or below sea level (see picture of Belize city below). Heavy winds and large waves accompanied the storm surge. Severe impacts have been felt by a number of coastal communities in Belize, including Port Loyola (Belize City), Gales Point (Stann Creek District), St. Margaret's Village (Cayo District) and others. Most of the impacts affected communities that were already in an under-privilege condition.



The Study: Ecosystems, Development and Climate Adaptation: Improving the knowledge base for planning, policy and management

Ecosystem-based approaches to climate adaptation involve governing and managing ecosystems in ways that enhance their resilience to climatic shocks and stresses and thereby maintaining, and where possible enhancing, the quality and quantity of services they provide to society and in so doing supporting human communities to adapt to current and future climate risks. This contributes in various ways to acheiving sustainable development and the improvement of livelihoods.

In Belize, the National Government has set up a National Climate Change Committee and its primary role is to advise the government on matters relating to its national responsibilities with respect to climate change, and in particular to the Convention and the Protocol. The Committee is also tasked with implementation of appropriate policies and strategies to ensure continued economic growth given the impact of climate change in Belize. A draft Government of Belize Policy on Adaptation to Global Climate Change has been developed and will be reviewed to incorporate latest findings from the Second National Communication. However the Committee has decided to develop a broader Climate Change Strategy that includes both adaptation and mitigation [4]. This overarching framework is aimed at encouraging all agencies in Belize to explore and access the opportunities being developed by the climate change negotiation process, such as capacity building, new sources of funding, and technology transfer. It also mandates the relevant government agencies to prepare adaptation policy options for their sectors (NMS 2010). The National Focal Point for Climate Change is currently based in the National Meteorological Service and is the Chair of the National Climate Change Committee. Three Working Groups are being set up by the Committee to make technical recommendations on issues of mitigation, adaptation and public awareness and outreach respectively. The National Climate Change Committee will be in charge of monitoring the implementation of the Adaptation Policy and/or Climate Change Strategy once it comes into force. While the role of ecosystems in the country's economy and local livelihoods is recognized in the Horizon 2030 Strategy (soon to be officially released) and acknowledged by the different ministries involved in the National Climate Change Committee, not much focus has been put on integrating ecosystem-based approaches into the adaptation planning processes. The Committee is mandated to mainstream climate change into development planning in Belize, but those involved are still deciding on a suitable process for how to do so. The establishment of a Climate Change Coordinating Unit is being proposed to governmnent, but it is unclear yet where such a Unit would be situated.

In this study we aim to analyze the role of ecosystems in meeting the inter-linked challenges of climate change adaptation and development/poverty reduction in Belize, and investigate the governance changes required for taking a more integrated approach to addressing issues of environmental degradation, poverty alleviation and climate change. To achieve this, we focused on the coastal and marine ecosystems and conducted a series of interviews and a two-day workshop involving key national stakeholders. This report is based on the fieldwork conducted in Belize illustrated in Figure 1 below. It synthesizes information obtained during the interviews and workshop on the processes of change, and the opportunities and barriers involved in mainstreaming ecosystem-based approaches into national adaptation and development policies and plans.

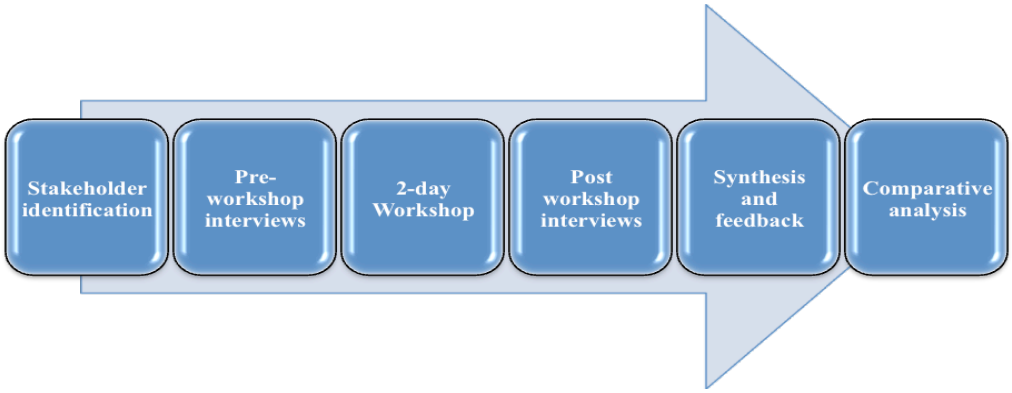


Figure 1. Diagram of activities during and after the fieldwork in Belize

This report is structured as follows:

Section 1 introduces the study and provides background information;
Section 2 gives a short description of the main drivers of change affecting coastal and marine ecosystems (both directly and indirectly) identified with the stakeholders, mainly through interviews but also in discussions during the workshop. It also highlights the main findings of a qualitative scenario building exercise conducted in the workshop exploring the progression of these drivers into the future.
Section 3 analyzes the processes of change in the governance system required to navigate towards the more desirable scenarios described in section 2, including policy development and implementation, institutional arrangements, and capacity and resources needed to integrate ecosystem-based approaches into development and climate adaptation plans and policies. This section also describes the current situation or baseline for Belize (i.e. where does the country currently stand in this process of integration).
Section 4 analyzes the opportunities and barriers identified with the stakeholders for further integrating ecosystems management into poverty reduction strategies and emerging initiatives on climate change adaptation at the national level.
Section 5 highlights the key messages coming out of this study, and explores some of the emerging themes and next steps.

II. DRIVERS OF CHANGE

The relatively low population density in Belize means that local human impact on the coastal environment is, on the whole, less than in more industrialized and densely populated countries. Different local drivers are behind the activities that affect the coastal and marine ecosystems and coastal population in Belize. Global drivers also have an effect and can intensify the impacts. Global and local drivers are inter-connected, and the impacts they cause can result in synergies or trade-offs that can be beneficial or detrimental for social adaptation and development. When analyzing the coastal and marine system (including human populations), it is sometimes difficult to distinguish drivers from impacts (or consequences), especially when taking a systems perspective, as impacts can often drive additional changes that in turn affect the nature and scale of the original driver(s) i.e. the existence of feedback loops. In this study, we tried to identify key drivers of change (local and global), and use these to explore possible impacts in the future under different governance systems.

Interviews revealed that the main drivers of change could be clustered in 1) population patterns, 2) socio-economic development, and 3) climate change. Changes in population and socio-economic development are reflected in human migration, particularly from other Central American countries to Belize, and from inland to the coastal zone. Urbanization processes, (over) consumption, access to resources, and poverty are also manifestations of demographic and development drivers. These manifestations influence local activities and ecosystems functioning resulting in degradation problems that include over-fishing (e.g. lobster and conch fisheries among others), sedimentation (e.g. from agriculture or infrastructure development), domestic sewage and solid waste disposal, industrial effluent discharge, and residential/tourism expansion along the coastline and cayes, which often entail the destruction of mangroves, littoral forests, and other habitats for the construction of seawalls, residential housing, and large hotels aimed at large-scale tourism. Other activities influenced by these drivers that pose a localized threat are current and potential offshore oil exploration and marine dredging operations, which can be particularly destructive when they occur close to the reef.

Climate change is an important driver of change in the coastal zone of Belize, as population in this area are highly vulnerable to climate risks such as floods, storms, hurricanes, and sea-level rise. From interviews, we gathered that people have felt an increase in climate variability over the past decades, with more hot days during the 'wet' season and more cold days during the 'dry' season. Red Cross informed about more people suffering of heat rashes, and increased spread of diseases such as dengue, both related to extreme weather conditions. The coastal population is particularly vulnerable to changes in climate because of the low-lying lands, poor drainage systems, lack of urbanization planning, and badly designed infrastructure. Coastal and marine ecosystems are also vulnerable to the manifestations of climate change. Hurricanes, storms and increasing sea temperature have a direct impact on coral reefs, sea grasses and mangroves.

Table 1 below shows a list of manifestations that relate to the climatic and non-climatic drivers identified through the interviews and used in the workshop. Some manifestations relate to more than one driver of change. A highlight captured from interviews and workshop discussions is that it is easier to influence and manage local socio-economic drivers than global drivers such as climate change, changes in the financial market, or changes in the trading system. For example, in the context of the coastal area of Belize, interviewees mentioned it is easier to change fishing practices to reduce impact on the coral reef than deal with extreme events such as hurricanes or bleaching events that affect the health of corals, or integration processes that encourage migration to the coastal area of Belize and put more pressure on the coastal resources [5].

Table 1. Manifestations that relate to climatic and non-climatic drivers of change

Population patterns	Socio-economic development	Climate change
Urbanization Migration Regionalization Globalization Consumption (e.g. fish, water)	Coastal development (e.g. dredging, mangrove clearance, tourism) Fisheries market Oil demand Regionalization Globalization Migration Urbanization Consumption (e.g. fish, water) Poverty and access to resources	Extreme events Sea-level rise Sea surface temperature

How can these drivers of change play out in the future? We intended to explore this question by looking at possible future scenarios that consider on the one hand change in drivers (from small to large), and on the other hand change in the country capacity (i.e. governance system) to address these drivers (from weak to strong). Participants in the workshop were requested to build four scenarios for 2050, thinking about the future manifestations that can emerge from overlapping changes in drivers with changes in the governance system. The general focus was on coastal and marine ecosystems and human populations in the coastal zone, but participants worked in teams to tackle a specific cluster of drivers. Two teams focused on climate change as the main driver of change (one team looking specifically at issues of resource access and poverty in the scenario outcomes), a third team worked with changes in population patterns as the main driver of change, and the fourth team built scenarios focusing on socio-economic development as the main driver of change. The following Table 2 summarizes the results obtained for the different scenarios.

Table 2. Qualitative scenarios for Belize based on changes in drivers and governance by 2050

	Population patterns	Socio-economic development	Climate change
Strong governance Small change in driver	Not dense population Good income per capita Increased life expectancy Transition to more sustainable practices More effective and efficient infrastructure Active civil participation Better access to education More employment More accountability Natural resource-based economy	Only possible if global economic melt-down, or if regulation creates perverse incentives on investment interests (e.g. policies that discourage potential developers), or if entire coastal and marine environment is under protective status Plans and policies are implemented and enforced Better revenue generation Improvement in corporate responsibility	National plan for adaptation in place Enforcement of regulation Funds are sufficient for implementation Horizon 2030 followed Super bond paid Gradual increase in fisheries Stable ecosystems and ecosystem services Baseline and monitoring maintained More inter-institutional coordination Improved technical and leadership capacity National plans in line with international commitments
Strong governance Large change in driver	Planned urbanization More resource competition and conflicts Better access to education More employment Dependency on food imports Regulated immigration Service-based economy	Regulated and enforced coastal plans Cross-sectoral coordination Increased standard of living Improved conservation of coastal and marine ecosystems Measures in place to prevent future infrastructure damage/loss Diversification of economy Use of cleaner technologies Higher employment Revenue generation	Loss of infrastructure Loss of land resources Strong climate change unit Revised Horizon 2030 Adaptive responses in place, including monitoring Alternative fisheries Changes in production systems Planned re-locations More inter-institutional collaboration General public informed and cooperative Cooperation on

			transboundary issues
Weak governance Small change in driver	Illegal resource extraction continues Decline or collapse of natural resources linked to poverty Corruption increases Transition to human disease outbreaks Lack of access to health care Lack of access to education Inequality Poor land use planning Increased pollution "Too little too late" syndrome in terms of international interventions	Not possible?	Status quo
Weak governance Large change in driver	Large population, increased density, and more pressure on resources More environmental refugees Increased poverty Urban sprawl Increased hunger and malnutrition Reduced life expectancy Increased conflict and crime Loss of culture and traditional knowledge Outward migration Political instability No leadership Coral bleaching and collapse	Increased levels of pollution Loss of biodiversity Loss of natural coastline Loss of ecosystems' integrity Over-exploitation of natural resources (e.g. over-fishing) More frequent flooding Extensive infrastructure loss and damage Private sector entities define own governance practices to prevent economic loss (e.g. specialized markets, standards) Decrease in life quality Higher poverty levels Increased risk of international penalties	Increased internal conflicts Transboundary issues Lack of enforcement Ineffective plans Loss of national security Loss of budgetary resources Loss of land and decline in resources Lack of national level adaptation, but individual responses Destabilized economy Increased poverty

General messages obtained from the scenario building exercise are:

- If governance is strong and the change in the drivers is small (called "Development within Carrying Capacities" by a team in the workshop) - future scenarios show an opportunity for implementation of policies and plans, adoption of more sustainable practices, better land use planning, improvement and maintenance of the carrying capacity of coastal and marine ecosystems, more inter-institutional cooperation, more active role from the civil society and private sector, and increase in national and per capita revenues.

- If governance is strong and the change in the drivers is large (called "Adaptation Challenge" by a team in the workshop) - future scenarios show a mix of opportunities and challenges. Opportunities relate to revisions and improvements in regulations and plans, diversification of the economy and changes in the production systems, development of an adaptation plan and measures with a strong coordinating unit, enhanced cross-sectoral collaboration, greater public awareness of the new pressures, and opportunities for job creation and higher revenues. Challenges are reflected in potential loss of infrastructure and land resources, increased resource competition and conflicts.

- If governance is weak and change in the drivers is small (called "Slow Decline" by a team in the workshop) - future scenarios seem to show a continuation of the current trends (i.e. "business as usual"). Poor land-use planning, over-exploitation and illegal extraction of natural resources continues, possibly leading to the decline or collapse of some ecosystems. Corruption and poverty levels increase, same as human health problems and inequality. International interventions are not depicted as effective.

- If governance is weak and change in the drivers is large (called "End of Days" by a team in the workshop) - future scenarios show increased pressure on ecosystems and humans. Poor management of resources and more extreme events lead to losses in socio-cultural, environmental and economic terms. Destabilized economy and internal conflicts exacerbate poverty levels. Environmental and other transboundary issues are drivers of forced migration, and lack of national capacity to effectively implement and enforce plans leads to a decrease of human security and life quality in general.

Based on the scenario building, each team conducted a back-casting exercise analyzing the processes of change that need to occur for the two "desirable" scenarios (i.e. strong governance/small change, and strong governance/large change) to happen. Teams analyzed these processes in terms of: Who changes and why? What changes and how? This analysis served as a basis to explore: 1) what change needs to happen in the governance system regardless of small or large changes caused by drivers; 2) what processes will be different in the case of small changes as compared to large changes. Comparing similarities and differences between both scenarios encouraged participants to consider the realities of dealing with uncertainty associated with how drivers will manifest into the future and the exact nature of the impacts, as well as the need for adaptive approaches to management and governance. It also helped participants reflect on the changes and investments that need to happen regardless of small or large future impacts, sometimes referred to as 'no regrets' options. Table 3 below highlights the main findings from this comparative analysis.

Table 3. Similarities and differences between processes of change that need to occur for the two "desirable" scenarios

What are the differences between the governance changes in the two "desirable" scenarios?	
Strong governance / Small changes or impacts	**Strong governance / Large changes or impacts**
More local action Role of individuals as stewards of shared resources, leadership by example More awareness raising than enforcement Maintaining ecosystem services and carrying capacity	More national and centralized oversight Role of the state as stewards of coordinated action Strong adaptation planning and implementation Stronger enforcement Revised disaster prevention and emergency response plans Private sector plays a more important role Increased international cooperation Increased need for conflict resolution and negotiation
What are the similarities, i.e. what governance changes would be made in both "desirable" scenarios?	
More technical capacity Better socio-institutional capacity Integrated approach and planning Important role of healthy ecosystems Better inter-institutional coordination/collaboration Public awareness and education Strengthened linkages across multiple levels of governance More resources and better allocation/distribution	

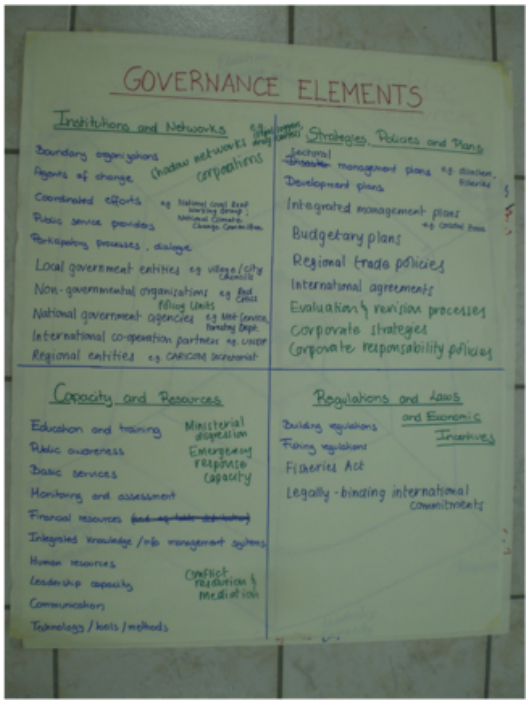
The results obtained from this comparative analysis seem to show a transition from more local-level action in the case of small future impacts to more national-level/centralized implementation of adaptation measures in the case of large impacts. Addressing large impacts also requires moving from awareness raising to enforcement and stronger coordination of action, including more important participation of the international community and the private sector. "No regret" changes that occur regardless of small or large future impacts seem to relate to socio-institutional capacity building, public awareness and education, integrated (cross-sectoral) planning (including ecosystem-based approaches), better resource distribution, and more collaboration between entities that interact at different levels in the governance system. Section 3 below describes the participatory analysis conducted during the workshop that helped us to explore the processes of change that the governance system in Belize needs to undergo in order to apply a more integrated approach (including ecosystem-based approaches) in social climate adaptation and national development processes, considering uncertainty associated with how drivers will play into the future.

III. GOVERNANCE SYSTEM

In the framework of this project, governance is understood to mean the set of actors and processes that guide the strategic and key operational decisions for a given area of responsibility, in this case the socio-economic development and the management of coastal and marine ecosystems. It relates to multiple scales (and equivalent decision making levels) and the relationships between them. In Belize, the governance of coastal and marine ecosystems involves a whole range of stakeholders from across the public, private and civil society sectors, operating at local, national, regional and international levels. In terms of organisational entities and the rules and procedures by which they operate, the governance system can include both formalised structures (e.g. government agencies, APAMO Network) and informal entities and relations (e.g. illegal fishing cartels), sometimes referred to as shadow networks.

By reviewing various documents and interviewing a number of key informants a list of key governance elements were identified (see picture below). Four clusters emerged out of these, namely:

- institutions and networks (e.g. village council, town/city council, National Coral Reef Working Group, National Climate Change Committee, concerned citizen groups);
- strategies, policies and plans (e.g. Horizon 2030, Coastal Zone Management Plan, National Climate Change Adaptation Policy and/or Climate Change Strategy);
- regulations, laws and economic incentives (e.g. Environmental Protection Act, shrimp eco-certification scheme, Fisheries Act);
- capacity and resources (e.g. qualified staff, monitoring data, emergency response capacity).



Having identified specific elements of the governance system in Belize (that in some way affect the health of the coastal and marine ecosystems), the aim was to describe the state of each cluster in the progression from there being lack of integration of ecosystem-based approaches to adaptation in development policies and planning, to full integration. Within the workshop, participants worked in teams, each team focusing on one of the four governance clusters. The exercise was structured around identifying 4 levels in the progression of integration, from integrating environmental considerations into development planning more generally, through mainstreaming climate change adaptation specifically into development planning, and then finally integrating environmental considerations, with those of climate change adaptation, into development decisions. Table 4 below describes the results obtained from the teams' discussions. It synthesizes each one of the 4 levels for each one of the 4 governance clusters identified by the participants.

Table 4. Process of change in the governance system

	Level 1 - first step to integration	Level 2	Level 3	Level 4 - full integration
Institutions and networks	Government agencies lead early coordination efforts; early signs of networks forming between development and environmentally oriented organisations; competition over resources still a dominant feature of institutional relationships; some trend-setting private sector actors start to gain awareness of the economic benefits of environmental considerations in business; civil society orgs (CSOs) work to raise awareness and link between local and national actors; researchers monitor key variables and disseminate reports	Create umbrella organisation with mandate to coordinate govt agencies and interface with non-state actors; formalise collaborative relationships; align strategies and invest in improving communications; agents of change emerge to encourage increased collaboration across public, private and civil society sectors; climate change committee formulates new policy and gets buy-in; CSOs support implementation and continued monitoring; more collaborative and multi-disciplinary research to reduce duplication and investigate linkages and more holistic, integrated approaches	National coordination platform linking to international agreements and other relevant networks working on issues of environment, development and climate change; integrate information on projected climate conditions, risks and vulnerabilities; sustainability and climate risk management become more of a factor influencing markets; all relevant government agencies engaged in these issues and directing resources accordingly; CSOs making use of climate science information to revise development and conservation projects and programmes and to influence policy processes to mainstream climate change considerations; research community working to make research more accessible and inclusive	National CC coordinating entity has buy-in at highest political level, power to convene and secure additional resources in the event of major climate events; transformational change occurring through extensive networks operating across many aspects of society (including the arts); Belize plays an important role in setting regional precedents and standards; a Climate Change Unit / Department in government is fully operational and well resourced; regional and international linkages extended and strengthened to leverage technology and knowledge transfers and funding, and influence international decision making; Belize hosts centres of excellence for adaptation research and planning support, coordinating regionally on trans-boundary issues

Strategies, policies and plans	Sectoral policies and plans in place, a few inter-sectoral strategies (e.g. Coastal Zone Management), but very limited budgetary support for implementation; some of the big corporates paying for environmental services; signed up to various regional and international conventions and agreements relating to environmental and economic issues	Revision of sectoral policies and plans to include climate change considerations; coordination of planning activities through the National CC Committee; establishment of co-management agreements; all plans have dedicated budgets attached to them; access more international funding; co-managers provide budgetary support; payment of environmental taxes by corporates and money directed to Dept of Environment; extensive corporate recycling policies; long-term development strategies and plans in place; actively involved in implementing a number of international agreements and recommendations	Multi-level disaster response plans in place coordinated by the Department of Environment (including for oil spills) and NEMO; CC considerations mainstreamed into inter-sectoral strategies and plans; integrated monitoring network designed with national coverage; sufficient budgets available for full implementation of CC related plans at national and local levels; finances available for emergency response and exploring green technologies; corporates held to account for implementing green policies; increased public awareness and pressure; green investments made by the cruise industry; long term development plans explicitly include sound CC considerations; National CC Strategy revised; Belize compliant with international CC agreements; Belize is active in ongoing negotiations	CC considered from both a social and environmental perspective in all disaster management plans and inter-sectoral strategies; monitoring results used to inform policies; sound petroleum policy in place and implemented; budgets in place that also account for future expected climate risks; CC fully integrated into the policies and plans of the public and private sectors (including in relation to tourism); high investment in green technologies; Belize is on the leading edge of international CC activities and approaches

Regulations, laws and economic incentives	Raise awareness of businesses (from local to multi-national) to environmental impacts of their practices; information sharing on best practices for production (e.g. shrimps, timber, etc.) in terms of both environmental and social impacts and benefits; environmental regulations adequately monitored and enforced (moving from education and awareness to sanctions); efforts underway to harmonise laws and their enforcement, as well as incentives and punitive measures; eco-certification schemes developed and marketed; Belize signed up to regional and international environmental commitments	Identify climate impacts, both social and environmental, and raise awareness amongst businesses; implement pilot adaptation measures to learn from and 'no regret' options; reform laws with an explicit climate lens while also seeking alternative means to generate behaviour change; include CC vulnerability assessment in the EIA process; include economic incentives into national CC strategy; broad-based public awareness raising and monitoring to enable enforcement and allocation of incentives; trans-boundary management of shared resources	Upscale pilots and build networks to support widespread uptake of certification standards; civil society groups actively involved in implementing and testing pilot actions and scaling up with government support; law reform fully aligned with national CC Strategy; resources and capacity built for integrated monitoring, adaptation support and enforcement across sectors; integrated policy framework that incentivizes low carbon, adaptive and sustainable development right from the individual to the national and international levels	Established eco-certification schemes facilitate the widespread adoption of best practices in production and consumption; local communities fully engaged in monitoring and implementation of policies and empowered to effect change; laws are fully aligned with sustainable policies and practices; broad-based collaboration between communities, CSOs, research organisations and government agencies in monitoring ecosystem health, implementing measures, evaluating impacts and altering practices; national and international markets and policy frameworks structured to facilitate low carbon development and equitable adaptation

Capacity and resources	Basic public awareness of climate change evident; NGOs working to further increase awareness; resources for targeted monitoring of few key indicators but limited coordination; early identification and fostering of leaders; few organisations with a person dedicated to mainstreaming CC issues into their work	Basic training for professionals available on CC; capacity and resource to collect baseline data with standardised monitoring methods and collaboration between multiple stakeholders; new sources of funding secured both internationally and through partnerships with private sector; multi-sectoral networks established around early adopters / leaders in the field; new technologies tested and modified for local conditions; improved communication leading to increase collaboration between different organisations	CC widely included in education and training programmes; monitoring extended to include social, environmental and biophysical variables with clear assessment protocols; equitable distribution of new funds to fill identified gaps; institutional capabilities to provide specialist research and training on sustainability issues, including CC; upscale technological innovations with adequate training in operational aspects; capacity to mediate conflicts of interest to enable cross-sectoral collaborations	CC thinking fully integrated into culture of broader society; fully integrated monitoring system and assessment results incorporated into revised policies and plans; sustainable financing mechanisms to enable full implementation of strategies and plans; climate considerations taken into account in decision making at top levels across all sectors; new technologies and improved practices available and implemented nationally, drawing on international experiences; open and transparent collaboration between all stakeholders both nationally and regionally

Note: for a full description of the 4 levels for each of the governance cluster (including components that make up each cluster) refer to the detailed matrix included in Annex 5

Baseline for Belize Governance System

Having considered the levels of progression in integrating ecosystem management approaches with climate adaptation into development, participants in the workshop deliberated over where Belize currently is in this integration process. Recognising that some stakeholders were not adequately represented in the exercise, participants estimated the baseline as follows.

Institutions and networks

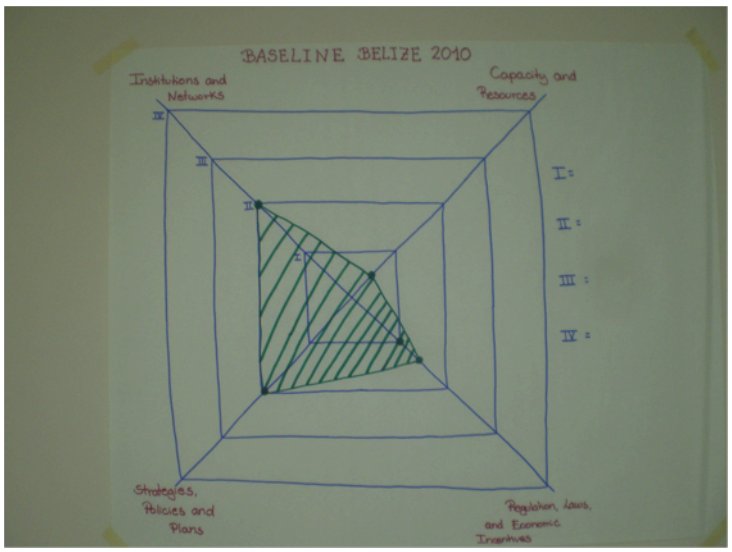
Currently Belize falls between levels 1 and 2 with some formalised coordination processes underway to address climate change challenges within a development context (e.g. re-establishing the National Climate Change Committee, setting up the Policy Unit under the Ministry of Natural Resources), but still a lack of clarity on the roles and lots of duplication and gaps in terms of who does what. One notable exception is the more advanced role that civil society organisations are playing in Belize, building capacity to integrate scientific information on climate change into their practices and working across scales to link between local and national actors. In some cases however, NGOs are seen as a threat to government, and this needs to be carefully addressed. The recently established Environmental Research Institute at the University of Belize is seen to hold lots of potential for providing specialist research and training capacity.

Strategies, policies and plans
Belize is estimated to be between levels 2 and 3 on this front. Numerous sectoral policies and plans are being developed or revised (e.g. Fisheries Act), in part to include some early climate change considerations. Various monitoring efforts are already underway that generate data and information that can be useful in informing policy development. There are long-term development plans in place (e.g. Horizon 2030, Tourism Development Plan) that consider environmental factors to some extent, if not climate change specifically, but implementation is lagging. Some private sector actors are beginning to engage through payments made for ecosystem services used in their business. Belize is committed to international agreements on climate change and is working to meet reporting requirements. Budgetary constraints are a notable factor holding up policy revisions and extensive implementation.

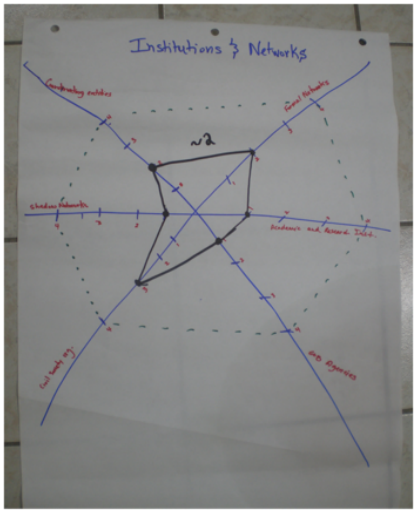
Regulations, laws and economic incentives
Belize is thought to be mainly on level 1 for this governance aspect, with still some way to go in revising sectoral laws to address climate change in a holistically manner, in getting the public and private companies incentivised to change their practices to be more environmentally and socially sound, and in getting broad-based engagement around long-term monitoring and enforcement. Belize is working to implement international conventions, e.g. Belize's 2nd National Communication to the UNFCCC is currently being prepared. Some eco-certification programs exist, which encourge private sector engagement on sustainability issues, but many producers don't have the resources to put in place what is required to adhere to the standards, and no incentives (e.g. tax breaks, rebates) are currently available to support that. There is also a need to build consumer awareness of these programs.

Capacity and resources
There are a number of largely isolated efforts to build capacity and invest resources in integrating environmental concerns, if not climate change specifically, into development processes (e.g. consistent and standardised marine monitoring), particularly by NGOs. However, due largely to a lack of communication and coordination (particularly across sectors), participants felt that Belize is only currently on level 1 in terms of having the capacity and resources where they are needed to support full integration of ecosystem management with climate adaptation into national development. Alongside improving communication and coordination, improving access to financial resources is also considered a key priority for moving forward with integration efforts. Having the Caribbean Community Climate Change Centre (CCCCC) located in Belize is an opportunity for increased research and training to take place and to attract funding.

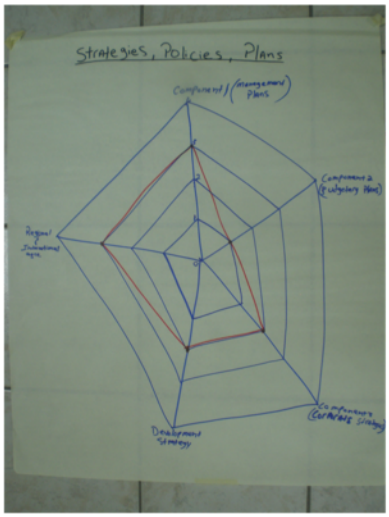
The value of collaboratively establishing this baseline is that it helps to identify immediate next steps that can be taken to progress further, and also provides something to measure change against in the future. The plot below depicts the estimated levels of integration currently attained in each of the four governance clusters. This plot is based on radar plots developed for each of the four governance clusters showing the levels for each individual component within the cluster (see pictures below). This of course represents a subjective assessment based on debate and consensus within each team. The baseline is highlighted in yellow in the governance-action matrix portrayed in Annex 5.



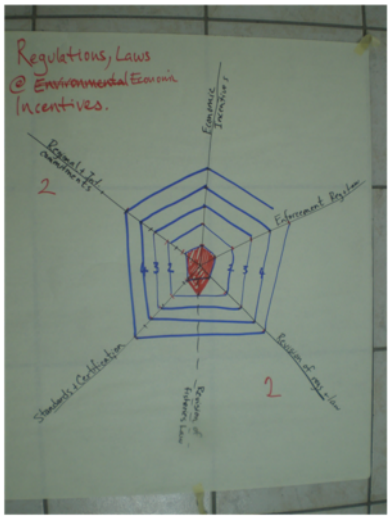
Radar plot depicting the baseline for Belize's governance system



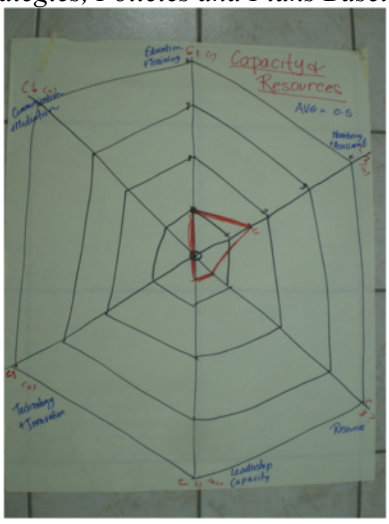
Institutions and Networks Baseline



Strategies, Policies and Plans Baseline



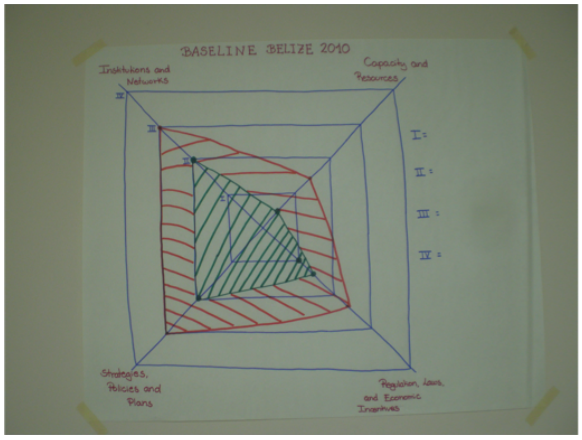
Regulations, Laws and Incentives Baseline



Capacity and Resources Baseline

IV. BARRIERS AND OPPORTUNITIES FOR INTEGRATION

After discussing the processes of change that the governance system needs to undergo to move towards integration, and defining the current status of the governance system in Belize, we worked with participants in the workshop to identify barriers and opportunities to move one level further in the process.



Radar plot illustrating the next level for each one of the elements/clusters of the governance system

The following are key opportunities and barriers highlighted by the participants during the final plenary discussion in the workshop. In general, there are several opportunities that can be explored in each one of the governance elements. All relate to no-regret options that could be implemented in the short- to medium-term and would accelerate national development processes through a more integrated approach that involves addressing both environmental and social issues relating to climate change. Challenges relate to up scaling or out scaling these no-regret options and moving toward more integrated and transformative actions. These challenges are important to identify and need to be tackled if the country is to move forward in this process. Annex 6 summarizes the barriers and opportunities identified by the participants.

Institutions and networks
There are several entities in Belize that have the mandate to coordinate work across sectors, but they work in isolation and oftentimes lack the support of key sectoral government agencies. In order to adopt a more integrated approach that links environmental management to climate adaptation and development processes, there is an opportunity to use the existing entities such as the Policy Unit in the Ministry of Natural Resources. These coordinating entities, or a new one established under the Office of the Primer Minister, can act as an umbrella to coordinate and facilitate the adoption of a more integrated approach across sectors. The challenge, however, lies in building credibility and working more closely with all Ministries (i.e. Ministry of Natural Resources but also Ministries of Planning, Finance, Agriculture and Fisheries, Mining, etc) to properly represent differing national priorities.

Formal and informal networks exist in the country, but need to be strengthened to address climate change. Networks have emerged in Belize to work on specific issues or combine efforts to be more effective, such as APAMO or the NEMO Network. Although these networks exist already for some years, they need to be strengthened in order to play a more active role in addressing climate change. One way to do this is to incorporate partners to the networks that have expertise in climate change (e.g. climatologists, climate adaptation or mitigation practitioners) from both the civil society and the private sector. Another way is to develop channels that can help access, manage and use up-to-date information about context-specific climate risks. The challenge here lies in finding partners with expertise in climate change, and relevant information that is readily available in appropriate formats for the use of different stakeholder groups. In this regard, a more integrated system to manage and share information could strengthen networks and support the functions and effectiveness of coordinated efforts at the national level.

Policies, strategies and plans

Policies, strategies and plans represent the element of the governance system that has progressed the most in the process of integration when compared to the other elements. Currently, regional-level processes are taking place around climate change issues that can influence national-level policies and strategies. Links to the regional processes can benefit the national planning in that it provides a window of opportunity to access more resources, funding, and expertise. This could be particularly important for the development of the National Climate Adaptation Policy, as it is currently under development and it is coordinated by the National Focal Point for Climate Change, who is also involved in regional climate discussions.

Likewise, Belize has oftentimes served as testing ground for pilot actions that are used for the development of regional-level strategies (e.g. Marine InVEST tool is currently being tested in Belize for regional application), which gives the country the opportunity to benefit from expertise and to build credibility at the regional and international levels. These links are opportunities to create public awareness and build in-country capacity for decision-making and planning. The challenge lies in maintaining this flow of resources, and sustaining the capacity for policy and strategic development and long-term implementation.

The other window of opportunity that is worth exploring in the country-context is the development of a "green wave". New market-based incentives such as the Reducing Emissions from Deforestation and Degradation (REDD+) mechanism and eco-certification schemes can help build an economic case to manage the environment more sustainably. In this regard, the challenge lies in 1) engaging the private sector to play a more active role in corporate responsibility, 2) incorporating climate risks in the market-based schemes and related national strategies, and 3) establishing the conditions for pilot projects that can test these opportunities on the ground, involving both civil society and private sector, with support from state agencies.

Regulation, laws and incentives

Current regulations and laws in Belize require the integration of environmental considerations into sectoral activities and encourage sustainable management of natural resources. However, they do not specifically address climate change issues, and hence, they do not directly promote practices that build national adaptive capacity. Although efforts are moving in this direction, the challenge lies in approving regulation, distributing supervision responsibilities, and most importantly in enforcing regulation once it enters into force.

In addition to regulation, which is mostly based on command-and-control, top-down approaches, new opportunities can be explored to develop incentives that can help create awareness and change behaviour on a more voluntary basis using bottom-up approaches. Pilot projects exist that are looking at eco-certification schemes in the agriculture and aquaculture sectors in Belize. For example, NGOs such as WWF have been working with ecologically friendly shrimp farms that are also incorporating practices that are relevant to ecosystem-based climate adaptation. Although some work has been done in the development of standards and economic incentives, up-scaling these efforts to a national/international level will need larger support from the private sector, the national government and the international community.

Capacity and resources

In general, in-country capacity is an issue because resources such as technology, funding and technical expertise are lacking. One of the challenges in accessing new international resources for climate change (both mitigation and adaptation) is the lack of a national implementing agency. Nevertheless, Belize has the opportunity to develop capacity in climate change as it hosts the Caribbean Community Climate Change Center and it has the possibility to attract and access

international capacity through this facility. The challenge lies in building capacity and leadership that stays in the country. One way of tackling this issue could be to develop training schemes that link to networks of national research institutes with support of state and non-state agencies and international research institutes. In these training courses, climate change needs to be addressed not only as a scientific issue, but include also the broader context (i.e. vulnerability, sensitization, etc.).

In addition, another approach that could help improving in-country capacity would be the development of a national communication strategy to share information and knowledge among key entities. Although different state and non-state organizations are working in monitoring and generating relevant information for ecosystems management and adaptation planning (e.g. monitoring of the barrier reef, monitoring of fisheries), the information is currently fragmented and is difficult to access. Moreover, findings obtained from monitoring efforts have not been used for high-level syntheses that can effectively inform policy and practices at broader scales. In this regard, integrating the monitoring systems, improving consistency, and establishing a platform that could help share and integrate the information would contribute to build the national capacity to move one level forward in the process of taking more integrated approaches for climate adaptation and development.

Organizations' points of view on next steps

At the close of the workshop, participants expressed an increased awareness of the need to mainstream climate adaptation into the planning and practices of their organisations, and a reaffirmed conviction to do so. NGO representatives committed to continued advocacy around these issues and investing efforts in accessing and sharing resources (especially information and funds) more widely.

There was a realisation and new-found appreciation for the scale of effort that is required and the urgency with which we need to get started – we need buy-in from all actors, we need to work towards widespread co-operation and better communication, we have a big task on our hands in asking people to undertake new activities and to do things differently. As one participant put it: "I will focus more on communication, trying to carry the climate change message in an approachable way and encourage more buy-in to the process".

Participants felt the workshop helped them realise that, even though climate change is a global problem, we can do something about it. Recognising that things are very dynamic, people articulated the need for taking a more adaptive approach, revising management scenarios and plans, based on learning as we implement. We have to get started and work on implementation, but with a view to reflect and learn as we move forward. "People follow the dollar", so quantifying impacts and assigning economic benefits to early action was mentioned as an important component of work that needs to be done, finding new ways to account for cultural values.

Finally, people recognised the challenge of pushing the climate change agenda alongside so many others and felt some frustration due to the slow rate of progress, or lack thereof, on a range of other environmental issues linked to development. But by working with local communities to explore the issues and identify different options, and by working more collaboratively within and between non-state actors, government bodies and the private sector, there can be a ground swell.

V. IMPORTANCE OF THE MAIN FINDINGS OF THE STUDY

The participatory approach used in the study helped in gaining a good understanding of the main issues affecting management and planning processes for ecosystems, development, and climate adaptation in Belize. Evidence-based information obtained from different sources was complemented with insights from participants with different perspectives. The exercises conducted during the workshop served as a way to exchange ideas and experiences, learn from each other, and identify opportunities to take next steps. The workshop and interviews also helped connecting people that do not interact often, and served as a basis upon which to promote discussion and build consensus on common pathways and scenarios for Belize. It is clear that there are a number of pilot actions being undertaken across Belize – from supporting the development of community disaster preparedness plans, through encouraging more sustainable shrimp farming and shoreline management practices, to fostering coral nurseries – that can be learned from and scaled up or scaled out through coordinated and collaborative efforts as the basis for longer-term transformational change.

The main outputs of this study are:

- Four qualitative scenarios for Belize that consider future changes in both drivers and the governance system
- A governance-action matrix that captures the processes of change that need to occur in the governance system of Belize in order to apply a more integrated approach (including ecosystem-based approaches) to climate adaptation and national development processes
- Concrete steps that can be explored in the short/medium- term, using existing opportunities to advance in the process of integration, while recognizing and accounting for challenges

The main outputs of this study will hopefully be useful to inform current discussions on climate change issues ongoing in the country, as well as ecosystem management strategies and climate adaptation planning. For example, the National Climate Adaptation Policy / Climate Change Strategy, the Coastal Zone Management Plan and the National Protected Area System Plan could benefit from the processes of change identified with the participants in the governance-action matrix for Belize. The outputs also link to the Horizon 2030 Strategy, as they include concrete ideas that can be implemented in the short/medium- term to build the country's capacity to support development processes through a more integrated approach that involves addressing both environmental and climate change issues.

The outputs can also be used by different state and non-state actors working to support the adoption of more integrated approaches to climate adaptation and development in Belize. At the end of the workshop participants mentioned different ways in which their organizations could use the opportunities identified in the study to move one level further in the process. They emphasised strengthening the network of collaboration, building technical capacity, improving information management and sharing among state and non-state entities, and building trust between different actors to have a more open discussion that can build shared understandings.

The findings of this study will be used by WWF and SEI in a comparative analysis that will also consider the findings of similar studies in Nepal and Tanzania. The comparative analysis will help develop a common framework that can be used to support development planning processes that integrate better both environmental and climate change issues. The outputs of this analysis will serve as a basis for further work in the regions on the case studies. In the case of Belize, this work will link to further work conducted by WWF focusing on the Mesoamerican Reef system.

Personal Communication

[1] Gonguez, D. Personal communication. Belize, September 2010
[2] Gonguez, D. Personal communication. Belize, September 2010
[3] Frutos, R. Personal communication. Belize, September 2010
[4] Gordon, A. Personal communication. Belize, September 2010
[5] McField, M. Personal communication. Belize, September 2010

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Annex 1. Project overview

Ecosystems, Development and Climate Adaptation in National Policies and Plans

Introduction

Recognising the need to address the challenges of environmental degradation, poverty reduction and climate change in a more integrated way, the World Wildlife Fund (WWF) and the Stockholm Environment Institute (SEI) are exploring ecosystem-based approaches to climate adaptation. This document provides an overview of the project we are currently conducting to identify the opportunities and constraints for integrating these approaches into national policies and plans.

Project purpose

National governments, donors and civil society organisations are increasingly seeking guidance for supporting adaptation. Given previous failures to integrate environmental concerns into national development planning and with MDG 7 being far off track, there is a critical need to provide early and consistent country-driven recommendations for integrating environmental and poverty concerns with emerging initiatives for climate change adaptation.

The primary purpose of this project is to generate learning on the potential for adopting ecosystem-based approaches to climate adaptation; and build our capacity to inform national-level policy processes on the role of ecosystems management in meeting the inter-related challenges of development, poverty reduction and climate adaptation.

Key questions

1. How do ecosystem goods and services support human well-being and the reduction of climate risks and social vulnerability?
2. To what extent have environmental considerations and ecosystem-based strategies been integrated into development policies and adaptation plans and programmes?
3. What are the opportunities for, and constraints to, further integration?

Project activities and outputs

This is an 8-10 month project that will hopefully become the basis of a longer term set of activities. It involves a review of scientific literature on ecosystems goods and services, human well-being, climate adaptation, and system resilience; and 3 country studies in Belize, Nepal and Tanzania. Each country study will involve a review of policy and planning documents, a series of interviews, and a workshop with key national stakeholders. The workshops will provide a space to develop a shared sense of the opportunities to be harnessed, and the barriers to be tackled, in integrating environmental considerations into national development policies and plans in the context of climate change. Based on the information gained through these activities, we will work to distil findings and recommendations on integrating the management of ecosystems and climate adaptation into development planning and investments, with evidence on why it is beneficial to do so, and make these available on WWF's Adaptation Learning Platform (ALPS) and weADAPT.org

Annex 2. Lists of workshop participants

Ecosystem Development and Climate Change Adaptation Workshop
September 7th-8th, 2010
CZMAI's Training Room, Belize City

Name	Organization	Email
Tanya Marsden	Policy Department, Ministry of Natural Resources, Environment & Industry	pcpu.mnre@gmail.com
Dennis Gonguez	Chief Met Officer, Belize Meteorological Service	dennis_gonguez@yahoo.com
Ann Gordon	Coordinator, National Climate Change Committee	anngordon56@hotmail.com
Dr. Melanie McField	Director, Healthy Reefs for Healthy People Initiative	mcfield@healthyreefs.org
Joyce Ujah	Belize Fisheries Department	fisheries_department@fisheries.gov.bz
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Kenrick Gordon	Department of Environment	
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Alex Martinez(7th)	Country Representative, The Nature Conservancy	Alejandro_martinez@tnc.org
Yvette Alonzo	Coordinator, Association of Protected Areas Management Organization	coordinator@apamo.net
Linda Searle	Coordinator, ECOMAR	linda@ecomarbelize.org
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Ana Hoare	Executive Director, Belize Audubon Society	executivedirector@belizeaudubon.org
Amanda Acosta	Belize Audubon Society	arburgos_78@yahoo.com
Lisa Carne	Marine Biologist, Coral Nursery & Reef Resilience Researcher	lisasinbelize@gmail.com
Ramon Frutos (8th)		rfrutos01@yahoo.com

Annex 3. Workshop agenda

Workshop Agenda

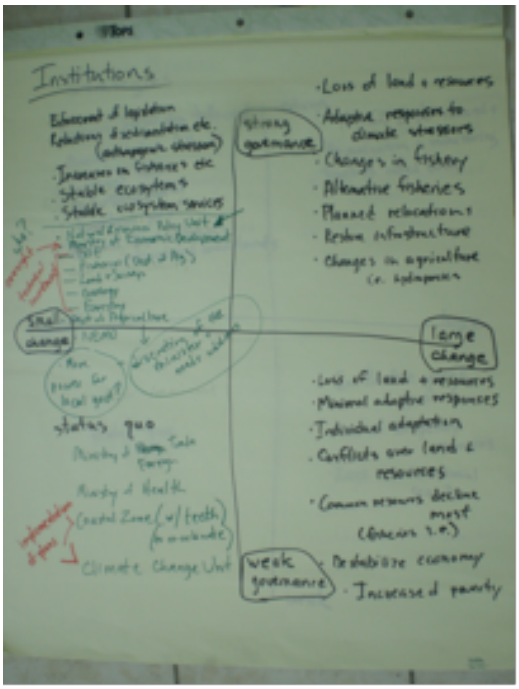
Ecosystems, Development and Climate Adaptation in National Policies and Plans
Belize City, 7th and 8th of September 2010

Time	Activity
Day 1	
9:00 - 9:45	**Registration, Welcome, Introductions** Opening remarks: Nadia Bood, Programme Officer WWF Belize Vincent Gillett, Chief Executive Officer Coastal Zone Management Authority & Institute
9:45 - 10:30	**Framework, Project, Workshop Agenda** General introduction: Helen Jeans, Adaptation Network Coordinator WWF International Project framework: Tahia Devisscher, Research Fellow SEI Oxford Workshop agenda: Anna Taylor, Research Fellow SEI Oxford
Break	
10:45 - 12:00	**Scenario Building** Work in teams to generate four scenarios for Belize, with particular focus on the coastal and marine ecosystems, based on drivers of change and country capacity, policies and plans to address these changes – this exercise helps us to explore what human communities and ecosystems need to adapt to and how
Lunch	
1:00 – 1:30	**Overview of Climate Variability and Change in Belize** Climate overview: Ann Gordon, Coordinator National Climate Change Committee
1:30 - 2:30	**Scenario Analysis** After completing the four scenarios, teams will conduct a back-casting exercise to analyze the process of change that would need to take place to achieve the positive scenarios, focusing specifically on institutional arrangements, policy processes and knowledge requirements to enable this transition
Break	

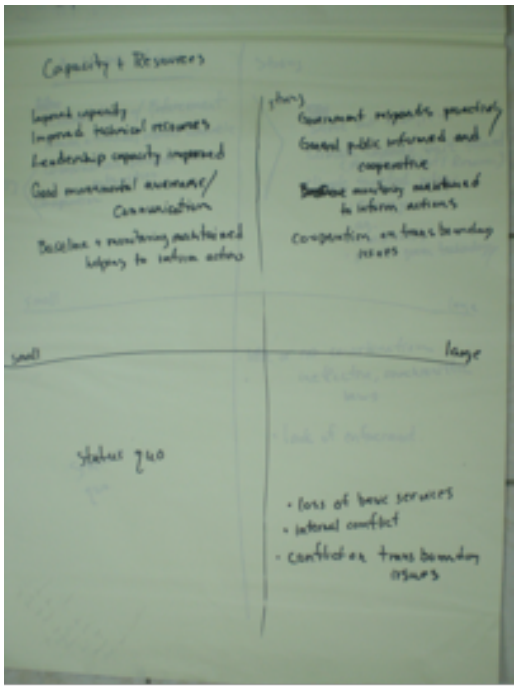
3:00 - 4:30	**Scenario Narratives** After completing the back-casting exercise, each team will present their outcomes in plenary, followed by an open discussion
Time	**Activity**
Day 2	
9:00 - 09:45	**The Role of Healthy Ecosystems in Climate Adaptation** Fred Hunter: Country Climate Change Risk Assessment project Sylvia Marin and Nadia Bood: World Wildlife Fund Adaptation initiatives
9:45 - 10:30	**Policy-Action Matrix** Based on the analysis generated during day one we will identify the elements of the governance system (capacities, institutional arrangements, etc) that are key in advancing the integration of ecosystem management into adaptation and development planning
Break	
10:45-12:00	**Policy-Action Matrix** After identifying the key elements we will, in teams, develop a matrix that describes the levels of integration of an ecosystem-based approach into adaptation and development planning and policy processes
Lunch	
1:00 - 2:15	**Policy-Action Baseline** Once the levels are defined, each team will work on establishing the current baseline for Belize based on expert judgement and consensus-building
Break	
2:30 - 4:00	**Policy-Action: Opportunities and Barriers** Having identified the current baseline, we will discuss in plenary the opportunities and challenges associated with reaching the next level in integrating an ecosystem-based approach into adaptation and development planning
4:00 - 4:30	**Closing Comments and Next Steps** Project next steps: Anna Taylor, Research Fellow SEI Oxford National outlook: Nadia Bood, Programme Officer WWF Belize Regional outlook: Silvia Marin, Climate Change Director WWF LAC

Annex 4. Pictures of scenarios

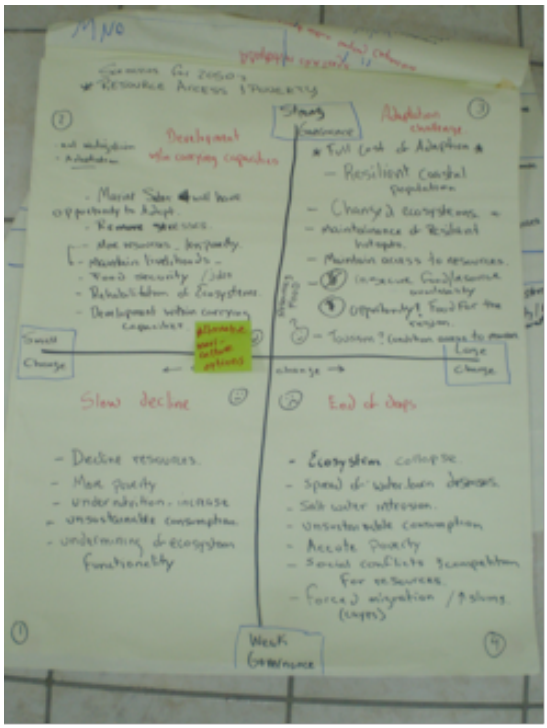
Population patterns scenarios



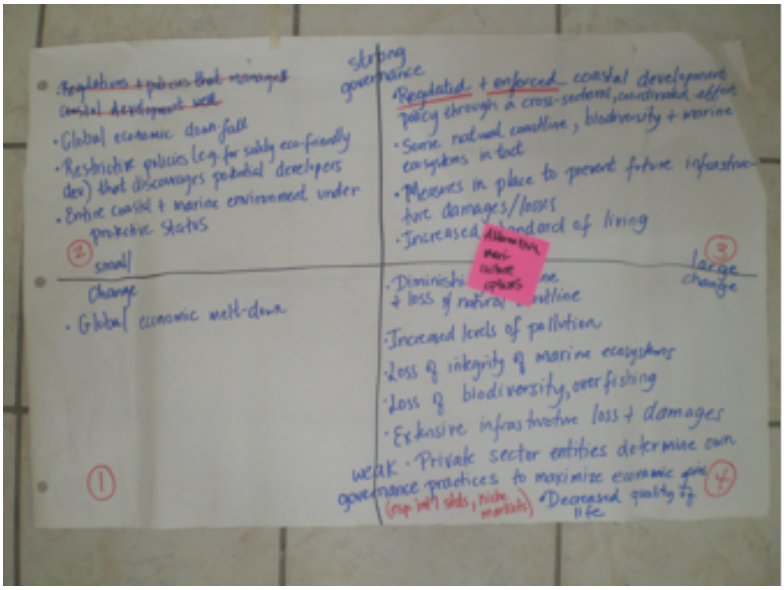
Climate change scenarios for institutions



Climate change scenarios for capacity/resources



Resource access and poverty scenarios



Socio-economic scenarios

Annex 5. G-A Matrix and Baseline

INSTITUTIONS AND NETWORKS				
	Level I	**Level II**	**Level III**	**Level IV**
Coordinating entities	Government agencies lead the coordination, understanding that they represent the people, coordination, guidance and enforcement	Creation of an umbrella organization to guide this process, formalized committee with recognized mandate, power of influence over other government agencies, and inter-facing with civil society representatives and other stakeholders	National level platform to coordinate integrated efforts, develping within the context of international agreements eg. CBD and UNFCCC, linking with social networks that are acting as similar coordinating platforms	Possibly exceptional power in case of emergency and catastrophic events, buy in of the highest level eg. Prime Minister's Office. Power to call for special funds. Recognized by international bodies as the overarching institution in case of major events that impact the country
Formal networks	Need to collaborate and share resources, integrated development that needs to integrate environmental considerations into development helps build networks, competition for resources, contradiction for policies need to be harmonized, identification of potential entities that can form a network	Formalization of relationships through MoU, LoA, formal agreements, distribution of roles and responsibilities, development of common goals, strategies that allign their effort in one direction, establish formal channels to keep communication, mechanisms to keep it dynamic and interactive	Bring additional expertise with partners that have experience and skills in climate information generation, scientific information, networks can expand, joint planning, modification of plans to integrate future climate risks and future scenarios	Start thinking fundamental change in your approaches, involve a broader spectrum of partners that can promote deeper change such as media, arts, develop an advisory board to do this, linking to other sectors, building networks of networks, trigger change at a larger scale, maybe play a leadership role in regional change, setting regional standards

Shadow Networks	Shadow networks emerge to replace the gaps left by formal networks. Informal private sector entities, role is to create awareness of the economic benefits of integrating environmental consideration into production practices, for sustainability, driven by income, economic benefit, preventing economic loss	Agents of change, glue between entities. Relationships are set up with the private sector, civil society organizations, and governamental agencies to work on voluntary non-legally binding schemes that play out in the informal market	Schemes operate in formal markets. Role is to use information on climate risks to create awareness on climate change, build more long-lasting partnerships with key partners such as NGOs, and private sector, which can in tun influence the agenda and support the sustainability of the informal networks, and make sure best practices and climate risk considerations are factored in	Some shadow networks become more formal networks. Some dissapear if purpose is achieved, once they served as agents of change. They are empowered to influence local decisions, capacity building of this formal networks is strengthened, they gain credibility in their context, information is shared more openly with the public.
Government Agencies	CC Committee includes various sectors, clarify role	Policy emerges out of CC Committee. Formally recognized (more than 10 organizations participate)	All key sectors represented. Capacity building, financial resources to be effective.	Formal Climate Change Unit or Department fully staffed and resourced.
Civil Society Organizations	Advocacy organizations, role in community outreach, policy development, awareness creation. Integrating environmental considerations into production practices in the field. Link between between local comunities and national governemental bodies, informing policies to integrate environmental issues into policy development, serving as technical advisor	Role in oversight of operation, making sure policies and plans are implemented, supporting monitoring systems	Promote the integration of scientific findings to see how climate change affects management practices, create awareness about these climate risks, influence policy to consider climate into development processes, promote projects that can contribute to building adaptive capacity at community and national levels, developing partnerships to new stakeholders,	NGOs can play a role in building an alliance between countries that are in the same situation eg. At regional level, in order to position the country more strongly in terms of attracting technical assistance, technology, funding. Looking for new partnerships that can help find access to these resources, and improve the lobbying power of the country in the international negotiations.

	for policy development, attracting funding for best practices		revisit projects and programmes planned by NGOs and local organizations, refocus and make these strategies more climate-proof	
Academic and Research Institutions	National University. Research, monitoring, publish information, disseminate.	Coordinated research, several organizations working together. Establish research priorities to reduce duplication and wasting resources. More research on integrated CbA and EbA.	Formal agreements with international research and academic institutions. More publications in user-friendly format. Inform policy documents.	Belize research institutions recognized as a center of excellence for adaptation research and action planning. Transboundary coordination for adaptation planning and research.

STRATEGIES, POLICIES, AND PLANS				
	Level I	**Level II**	**Level III**	**Level IV**
Management plans	CZMAI, Forestry Act, Fisheries legislation, Mangrove legislation, NPAPSP, Central Building Codes, EPA regulations, Geology/Petroleum Act, Lands Act, Cayes Dev guidelines.	MET becoming focal point for CC; establishment of CCCCC; Policy Units in ministries; Revision to include CC: Mangrove Leg, Geo/Petroleum, EIA (07), Cayes Dev Guidelines, Draft of Integrated CZM plan, WCS/Fisheries revising Fisheries Act; Co-mgmt agreement; National Grounding Standard Operations plan.	NEMO, Petroleum policy, Oil Spill Plan, and Red Cross considers climate risks; CZM panning with climate risks consideration; climate risks consideration in MPA plans; National Coral Reef Monitoring Network TOR;	national/district/local disaster response plans include climate risks from both a social and environmental perspective; climate smart ICZM plan and national and local-based MPA plans; NCRMG resilience monitoring data inform policy. Petroleum policy with climate risks consideration.

Budgetary Plans	Insufficient allocation of funds despite the existance of plans/strategies; policies exist but specific budgets are lacking	When Policies are developed then specific budgets are attached; PACT; more funding from international donors become available; co-mgers provide budgetry support	Sufficient funds for response emergency and green technology exploration. Sufficient funds for implementation of climate policy and plans (at local and national levels).	Suitable and appropriate budget availability with consideration of future needs as climate changes
Corporate Strategies	Payment for environmental services by major industries; Big H, Caribbean Pride, Bowen & Bowen, Verena; Oil industry	Money collected from environmental tax and payment for envi services should go to DOE. Cuellos, Travellors Rum, etc companies collecting bottles and reusing.	Held accountable and should have department to collect bottles, however it's important to set policy for treatment of bottles; create pubic awareness for RRR of rum bottles; Go Green - Best Practices promotion dealing with a wide range of issues and outreach; Green investment from Cruise industry	CC fully integrated into private and public sector. Create new markets for investment in innovative green technologies.
Development Strategy	Cruise Ship Industry revisited; Oil industry; Manifestos; CZM Strategy; Biodiverstiy Strategy 1998; National Envi Action Plan 1999	Horizon 2030 Plan; Ministries development plans; Tourism Development Strategy	Revision of Horizon 2030 to include CC risks; National CC strategy revision; Caribbean Community Climate Change Centre; REED (carbon credits) - government needs to make steps to align national agenda with international requirements; Tourism Strategy to include CC considerations	CC is fully integrated into strategies like the Tourism strategy.

Regional and international agreements	Stockholm Convention; MarPol;International Whaling committee; World Heritage sites; CITIES; IUCN, CARICOM Free Trade agreement,	Tulum Declaration; Montreal Protocol; Caricom; Trade C30CARICOM Free agreement abide by local regulations and guidance; CCAD (SIDA), CPACC, MACC and 5Cs. Persistent Organic Pollutants (POPs) analysis; 1st phase completed, 21 chemicals, CARICOM contries	Belize is a signatory to UNFCCC, Kyoto Protocol and IPCC; Copenhagen Accord; First National Communication to UNFCCC completed with 2nd one under process of development; Barbados Plan of Action (SIDS); negotiations with respect to REED (carbon credits);	3rd National Communication to UNFCCC; Belize fully signed onto CCAD CC strategic approach.

REGULATION, LAWS, AND ECONOMIC INCENTIVES				
	Level I	**Level II**	**Level III**	**Level IV**
Standards and Certification	Connecting producers and businesses to groups producing environment data so industry understands and can respond to feedback from the environment. Best practices for production (shrimp, timber, sugar cane, coffee). Fair trade standards (social, water quality, etc). Monitoring by local groups and government agencies enabled.	Identify climate impacts on eco and social systems. Identify 'no regrets' action and implement and identify pilot actions to understand how climate may impact industries and actions that can be taken. Build awareness of how CC effects business amongst producers.	Upscale pilots. Create/enhance mechanisms for integration and implementation of certification standards via networks with producers, civil society, market mechanisms.	Eco-certification standards facilitate best practice at the local and national level. Efforts to combat ecological and carbon footprint integrated into national and international standards.

Fisheries Law Revision	Fishing licences include environmental regulations which are monitored and enforced. Local fishermen are made aware of environmental impact, monitoring of fish stocks, coral bleaching data, no catch areas in place.	Identify climate impacts on eco and social systems and ask if awareness processes, regulations, no catch and MPA are adequate? Modify management so effective.	Take measures to build consensus amongst fishing communities e.g. connect them to climate and impact data so see feedback from environment via 'no regrets' action coupled with awarenes programmes. Civil society could idenifty and implement pilot actions, demonstrate impact and upscale with govt. support. Maintain limits on access to international and national water for fishing.	Responsive to data. Works with local populations. Local communities aware of benefits. Local communities empowered to effect necessary change/take action e.g. no catch.
Law Revision	Law reform has taken place to update law - eg. in relation to mangroves, solid waste, etc (but they do not explicitly address climate change). Law and enforcment needs to be harmoised	Law Reform with a view to creating an effective legal framework without a burden of control. Dissemination and public awareness of new laws. Seek alternative means to create behaviour change e.g. tax incentives, etc. More tools in the toolbox	and Law Reform aligned to CC Strategy	Law fully aligned with sustainable development policies and practices.

Enforcement	Improve compliance with EIA and other regulations . Recognise enforcement as a process that moves from awareness & education to sanction. Harmonisation of sanctions and incentives.	EIA include vulnerability to climate change. Massive awareness raising leading to attitudinal change. Enhance monitoring and capacity to influence/enforce adjustment. Empower local mediation and conflict transformation processes.	Integration of enforcement across sectors. More broadly empowered enforcement officers. Monitoring of CC impacts and adaptation efforts and enforcement are integrated. More resources and capacity.	Coastal zone is a sustainably managed MPA using CCA policy/plan with community/private sector and other users engaged in awareness and enforcement. Very complex but necessary to get community buy-in to enforcement efforts and stewardship of natural resources including very clear data feedback from the environment to the community. More resources and capacity. Build credibility and trust of scientific community - role for civil society - involvement f community in monitoring activities conducted by trusted civil society organisations. Diversification of economic activity.
Economic Incentives	Eco-certification. Carbon credits for low carbon development and economic activity. Harmonising incentives and sanctions; markets and eco-certification.	Payment for ecosystem services combined with education/awareness and stewardship programmes. Producers, civil society, govt has data to ensure incentives achieve real environmental impact. Integrate economic incentives into new CC strategy, policy and plans (being developed).	Integrated policy framework that incentivises low carbon, adaptive and sustainable development. Education and awareness to create bottom-up demand for sustainable practices and lifestyles.	Whole national and international market is structured to reward low carbon development, climate change adaptation and mitigation.

Regional and International Commitments	Debt for nature swop. Carecoms regulations and obligations. Signed up to REDD+, UNFCCC and other international environmental agreements	Trans-boundary management of shared resources e.g. Guatemala and Honduras pollution of reef leading to loss of coral and habitat possibly financed by PES mechanisms.	Integrated policy framework that incentivises low carbon, adaptive and sustainable development at international level together with education,awaren ess and incentives to create bottom-up demand for sustainable practices and lifestyles. Integration of International Environmental Agreements, UNFCCC, and trade agreements.	Integrated policy framework that incentivises low carbon, adaptive and sustainable development at international level together with education,awareness and incentives to create bottom-up demand for sustainable practices and lifestyles. Integration of International Environmental Agreements, UNFCCC, and trade agreements.

CAPACITY AND RESOURCES				
	Level I	**Level II**	**Level III**	**Level IV**
Component 1- Education & Training	Stakeholders (public and private sectors, all levels) have awareness and clear understanding of CC issues, NGOs can promote this (have network and financing)	CC issues and adaptation included in educational institution; specific stakeholders being trained in adaption measures (teachers, technical officers, field workers, fishers, private sector etc.) (including training in monitoring/assessme nt methodologies)	concepts are included in education and training for policy makers, local governments, central government, major utilities, private sector companies	CC and adaption integrated in society/culture - built into the general thinking
Component 2- Monitoring & Assessment	Targeted monitoring of key indicators, establishment of pilot projects (e.g. water temperature, sea level, indicator species)	Collection of baseline data, establishing of database system, have trained people for monitoring and standardized monitoring methods implemented by multiple stakeholders	Implement social, environmental, biological monitoring and develop assessment protocols/tools for each of these	Incorporated data/assessments into policy & plans, have a fully integrated monitoring system

Component 3- Resources	Identify what we already have (e.g. finances, human, capacity such as equipment, infrastructure, labs, etc.) and what is needed i.e. identify gaps (for pilot projects)	Identify & procure sources of funding; encourage Public Private Partnerships, encourage Economic Incentives	Distribution and allocation of funds in order to fill the gaps identified in level 1	Sustainable finances / resources for implementation of all activities
Component 4- Leadership Capacity	Identify leaders among stakeholders and train them to enhance their leadership skills to push forward CC agenda; provide incentives (benefits as relevant to the person and their context, could be good/equitable salary or recognition) for them to take on the leadership role	Strengthen partnerships between leaders of stakeholder groups (private, public, organizations), make connections and find mutually beneficial activities through workshops, forming committees, etc.	Build institutional capacity of specialist entities to do research & provide training (e.g. private sector setting standard in the work that they do to establish 'better practices' - space for improvement)	Integration of CC into decision making by leaders across the board
Component 5- Technology & Innovation	Identify what is working in country and what is needed	identify suitablity technology for Belize (energy, maintance, locations, etc.), establish pilots/ modify to adapt locally e.g. in the citrus industry taking a plot to test new technologies and practices	Implement technology and innovation at a larger scale, training people in operation (maintenance, etc.)	National implementation/ better practices (using as case study for other countries regionally)
Component 6- Communication & Mediation	Develop a communication and training strategy including mediation/negotiation	Identify areas of duplication in activities / efforts / plans / policies and reduce duplication, identify and initate areas of collaboration better between all stakeholders (gov, organizations, public, local government)	Have cross sector collaboration established through good communication and mediating different interests	Open/transparent collaboration between all stakeholders both nationally and regionally i.e. scaling up from level 3

Annex 6. Table of opportunities and barriers

Elements	Barriers	Opportunities
Institutions and Networks		
Coordinating entities – Policy Unit	Does not have by-in international / national / environmental / level	Currently exists
	Isolated (not credible)	They have mandate
	Needs credible staff	Interest to move under the PM Office
	Needs permanency	
Formal networks	Limited experts	Have formal structure
	Limited access to information	Have mechanism to attract partners and create links
	Not enough dissemination of information	The information is generate in-country and can be made available
	Information is not user friendly, not useful	
Shadow networks	?	?
GOB agencies	Financial resources	Key people in committees
	Capacity lacking	Credible
	CC formally or widely recognised	
Civil society / NGOs	Financial and human resources lacking	More peer learning and exchange
	NGOs are seen as a risk	Credible
Strategies, policies and plans		
Management	Political will, awareness	Adaptation funds
		COP 16
Budget	Finances	Lobbying REDD
	Priorities	Successful pilot actions
		Collaboration between civil society and private sector
Corporate	Start up costs	Policy change
	Awareness	Fiscal incentives
	Lack of communication between private sector and NGOs	'Eco' certification
		Economic feasibility studies
		Cost benefit analysis
Development	"buy-in"	Implementation plans / strategies
	Political will	Self-promotion as "green"
Regional / international	Limited resources	Taking advantage of existing international strategies (e.g. REDD)
Capacity and resources		
Education and training	Lack of support (financial, human) resources	Have people that can be trained
	Lack of qualified trainers	Projects in near future that can provide funding for training
		5C located in Belize (access to technical people and funding)
Monitoring and assessment	Lack of consistency, standardisation and coordination (i.e. targeted monitoring)	University of Belize's Environmental Resources Institute (ERI) database system expected to be activated soon
	Knowledge about and ease of access to database	People with basic training in monitoring (e.g. tour operators trained to monitor basic coral health indicators)

Resources	Lack of national in-country implementation unit for direct access to adaptation funds	CC is a hot topic therefore funds are available to tap into (especially internationally)
	No mechanism for accessing carbon credits	Market exists for carbon credits (large forest cover)
		Technical people in-country
Leadership capacity	Lack of equitable remuneration	Economic benefits
	Work no recognised / valued	Shared interests exist that can be capitalised on
	Political climate (issues highly politicised and people want to avoid the fray)	Qualified human resources
Technology and innovation	Financing (e.g. high taxes on imports; high operational costs)	Willingness to try new technologies
		Some countries willing to transfer technology
Communication and mediation	People talk but activities are not coordinated	Willingness to coordinate activities
		Existence of some cross-sectoral committees
Laws, regulations, incentives		
Standards, certification, economic incentives	Resources required by producers / farmers to comply e.g. water treatment, recycling systems	"eco-certification" standards are being formulated under auspices of WWF / FAO, etc.
	Incentives lacking for recycling, etc.	Communication strategy and awareness programme to make consumers aware and use eco-certified products
	Weakening of eco-certification programme	Connect self interests of producers to environmental standards
	Lack of consumer awareness of CC and eco-certification	Explicitly address CC with existing (& new) producers within eco-cert. programme
Enforcement – fishing law	Community / stakeholder buy in	Identify 'no-regrets' actions & enhance then by integrating education / awareness / consensus building regarding CC & impacts
	Resources	Civil society pilot and upscale with government support
Law revision	Civil society perceived as "top down" and interfering	Civil society plays important role in updating environmental law that could be developed by explicitly addressing CC, particularly in relation to new CC Strategy (national) & Climate Change Centre